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ABSTRACT

A study of the feasibility of establishing a Center for Advanced Technology Training (CATT) at the Albuquerque Technical Vocational Institute (TVI Community College, New Mexico) was conducted by members of the Albuquerque business community, government representatives, and college administrators. Phase 1 of the study was an examination of the conceptual feasibility of the CATT, and Phase 2 was the initial implementation plan. The Phase 1 study found a clear gap in the ability of the TVI Community College to meet the needs of the growing economy and employers in the Albuquerque area. Area businesses and industry, as well as the college's administration, found the proposed CATT to be viable and innovative. The second phase continued the team approach of the first phase to plan for: (1) an industry hub and service center; (2) teaching factories; (3) program incubators and catalysts; (4) outreach offices/extension services; and (5) educators and gateways to work. Specific plans for management are detailed. Four appendixes list the workgroup members, present detailed concepts of new technologies and skills, discuss key characteristics of CATT models, and offer a list of New Mexico occupations generally requiring postsecondary education. Four unnumbered tables in the text and three in the appendixes provide supplemental information about the planned CATT. (Contains 24 references.) (SLD)

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ED 389 260

TVI
COMMUNITY
COLLEGE

CENTER FOR ADVANCED TECHNOLOGY TRAINING (CATT)

Feasibility Study

August-September 1995

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ORGANIZATION OF THE STUDY REPORT

The Center for Advanced Technology Training feasibility study was conducted by the Albuquerque area business community, government representatives, and TVI administrators. The study was reported to the TVI Governing Board in August and September, 1995, in two phases.

This document is a compilation of the two reports. It has been organized into separate sections for each phase of the study, with combined appendices. The phases of the study are color coded for quick reference:

Phase I: conceptual feasibility (yellow)

Phase II: initial implementation plan (white)

Appendices

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TVI CENTER FOR ADVANCED TECHNOLOGY TRAINING

1995 FEASIBILITY STUDY
EXECUTIVE SUMMARY

The process of the feasibility study resulted in a clear picture that there is a gap in TVI's current ability to meet the needs of a growing economy and simultaneous rapid pace of the technological change affecting area businesses and industry. There are implications for associate degree programs; however, the requirements identified in the needs assessment call for a new response from TVI. The concept of a Center for Advanced Technology Training approved by the TVI Governing Board as a viable, innovative means of addressing these identified needs.

•Throughout the country, community college advanced technology centers' roles in economic development are quite different from that of research universities. The community college centers are linked directly to aspects of economic growth associated with applications of technology in their service region. They are intended to increase the number of jobs; the technical skills of employees; productivity, quality, and competitiveness; and the overall economic health of the region. Their ability to respond rapidly to train potential employees attracts new businesses and enables quick retraining that encourages the expansions of existing businesses and industry. It is a common view of those involved with advanced technology centers, that if they are to contribute to economic and community development initiatives in the future, they must continue to develop the partnerships they have begun with other educational institutions, business, industry, labor, economic development organizations, and their communities. They must be champions of change and demonstrate that they can handle change effectively in meeting the needs of employers.

•The National Coalition of Advanced Technology Centers (70 member community colleges) define an advanced technology center as: **and advanced technology application and training mechanism established by a two-year postsecondary institution to support economic competitiveness by providing education, training, and consultation services that promote greater awareness and use of advanced technology.**

•As the manufacturing community in Albuquerque grows, the need for high quality labor will become more important. This situation will become even more critical for the following reasons: first, the demand for qualified employees is growing faster than the population and secondly, as manufacturing becomes more technical the qualified pool will get smaller. The establishment of a high tech manufacturing center at TVI would help mitigate industry's future labor pool concerns.

•Without exception, business representatives involved in the needs assessment of the TVI Feasibility Study stated that curriculum must be (1) industry-driven to industry standards (2) able to provide rapid response (3) an intensive format (4) short-term and

flexibility scheduled, and (5) use equipment, materials, and processes that change multiple times during any given year. They concurred that the training must be *hands-on, applied*, not *theoretical*.

PHASE I

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PHASE I: CONCEPT FEASIBILITY/PROGRAM IMPLICATIONS

INTRODUCTION

TVI Governing Board Resolution 1995-34, adopted on June 13, 1995, directed the administration "to conduct a feasibility study for a center for advanced technology training and to incorporate the study into the Institute's five-year plan..." The Governing Board resolution further directed the administration to actively explore funding sources for such a center. (see attached)

Prior to beginning the Center for Advanced Technology Training (CATT) comprehensive feasibility study, staff considered several questions: What planning/research/discussion was there prior to the Governing Board Resolution? What are the basic information needs for the TVI Governing Board to further consider the concept? What are the basic information needs for other stakeholders? What ideas are being discussed by those who are stakeholders in the CATT concept?

This study was designed to address those questions. The results will be reported in two parts. Phase I is a study of (1) whether the concept of an advanced technology center is feasible as an innovation at TVI, and (2) an analysis of how such a center would be incorporated into the long-range plan for TVI. Phase II will be a plan, including program detail, an organizational/management design, facilities assessment, and an analysis of resource alternatives.

Background of an Evolving Study.

President Alex Sanchez and other administrators, as well as some faculty, have become increasingly aware that although local industry and business are enthusiastic in their support for the quality of TVI instructional programs and graduates, they are increasingly requiring training that is customized to meet their rapidly changing needs to keep pace with technological changes. Discussions with colleagues across the country indicated that many community colleges had developed "advanced technology centers" to respond to similar demands.

Intrigued by the concept of the centers, in May, 1994, President Sanchez, Vice Presidents Jan Micali and Michael Glennon, and Technologies Dean Phil Callow visited Rock Valley College Technical Center to see if the actual operation of the centers was as beneficial to their communities as the written descriptions they had reviewed. Dean Callow subsequently visited Texas State Technical College Applied Technology Center in Sweetwater and Waco and with instructor Mary Jane Willis, the El Paso Community College Advanced Technology Center. President Sanchez visited the San Diego Center for Advanced Technology at the San Diego City College. Dean Callow and Dean Rodman visited the center at Glendale Community College, which is part of the Maricopa System in Phoenix. Dean Rodman also visited the D. J. Bordini Center at Fox Valley Technical College in Appleton, Wisconsin.

Simultaneously, the concept was being discussed by Albuquerque business leaders and City officials. The idea of a TVI center to keep the area's expanding work force current and competitive was being discussed by organizations such as the Economic Forum, Albuquerque Economic Development, the Greater Albuquerque Chamber of Commerce, and the Hispano Chamber of Commerce.

In October 1994, the TVI Foundation began discussing the concept of an advanced manufacturing technology center. The idea of a center was brought to the Foundation by member Dale Dekker as a possible 30th anniversary campaign project, and the Development Committee was in favor of pursuing the idea. The Foundation formed an Advanced Technology Center committee in 1994. A concept paper was prepared by Mr. Dekker and the idea drew the attention of the TVI Governing Board Property Acquisition Committee.

The June 13, 1995, Resolution by the Governing Board recognized the potential of responding in an innovative way to the pressing needs of the growing business and industrial sector in the Albuquerque area. President Sanchez discussed the study intensively with his administrative team and outlined the framework. An August deadline was set for an initial report to the Governing Board and Associate Vice President for Instruction Ruth Tangman was directed to coordinate the project, focusing on the following components:

- analysis of employer and community needs and ideas, as customers of TVI;
- definition of the concept of a Center for Advanced Technology Training, including the relationship of the concept to the mission, programs and operation of TVI;
- analysis of the experience of other community colleges in planning, designing, implementing, and operating similar programs and services;
- description of potential instructional programs;
- description of potential organizational/operational structure;
- analysis of fiscal feasibility, including identification of potential resources for (1) implementation and (2) ongoing operations

A clearly defined methodology for the feasibility study was developed to assure that the study would provide the information implicit in the Governing Board Resolution. The study was conducted by a series of teams operating in tandem to produce the initial report to the Governing Board.

FEASIBILITY STUDY METHODOLOGY

Initial Consideration of the CATT Concept: Teams were established to involve appropriate stakeholders -- TVI administrators, business leaders, and city professionals who are knowledgeable and involved in economic development and occupational training. Given the need to respond to the Governing Board Resolution as promptly and comprehensively as possible, the teams were assigned to commence work immediately and report collected data as it was compiled to the study coordinator.

Team #1--MODEL IDENTIFICATION
Phil Callow, Dean of Technologies
Lois Carlson, Assistant Dean, Business Occupations
Pat Foy, Southwest Region Training Manager, Intel Corp.

Assignment: Review information about community colleges with advanced technology centers to determine successful conceptual models for TVI to consider.

Tasks:
1. Conduct written/telephone follow-up survey of colleges
2. Review materials received from colleges
3. Analyze data
4. Prepare a matrix of characteristics

Team #2--NEEDS ASSESSMENT

Jackie Sanders, Dean of Business Occupations
Lois Carlson, Assistant Dean, Business Occupations
Sally Pearson, Dean of Health Occupations
Dale Dekker, TVI Foundation, President of Dekker/Perich Architects
Doug Bosomworth, Vice President and Director of Ceramic Products, Motorola
Marshall Suarez, Quality Manager, Motorola
Carroll Cagle, President, Cagle & Associates/Philips Labs
Carol Radosevich, Director, Economic Development, PNM
William Alzheimer, Director, Manufacturing Technology, Sandia Corp.
Erik Pfeiffer, Economic Development Officer, City of Albuquerque
Shirley Wozniak, Senior Planner/Economist, City of Albuquerque
Leroy Pacheco, President, Hispano Chamber of Commerce
Frank Romero, Assistant Area Director, NM Department of Labor

Assignment: Focus on the training needs of TVI's business/industrial customers, working in partnerships as much as possible to consider the community's need for economic development and plans for growth.

Tasks:

1. Hold meetings and discussions among stakeholders to develop the vision and a description of an industry-driven program.
2. Compile labor market/work force projection data.
3. Compile local economic development and planning data.
4. Identify data needs and linkages for long-range planning.

Team #3--RELATIONSHIP OF CATT PROGRAM CONCEPTS TO TVI

Richard Birkey, Assistant Dean, Trades & Service Occupations
Dona Ace, Director, TVI Contract Training
Roslyn Block, Director, TVI Small Business Development Center
Harold Washington, Director, TVI Continuing Education Studies

Two additional teams will be established to commence their work during Phase II: Plan for a Center for Advanced Technology Training:

Team #4--FISCAL ANALYSIS/MANAGEMENT
Lois Carlson, Assistant Dean, Business Occupations
Phil Callow, Dean of Technologies
Joe Rodman, Dean of Trades & Service Occupations
Jerry Pacheco, Vice President, Norwest Bank
Cliff Schneider, Vice President, Sunwest Bank
Ann Riley, Program Manager, Regional Partnerships/Technology Transfer/Commercialization Sandia Corporation

---

Team #5--FACILITY PROGRAM
Members to be selected from Teams 1-4, and augmented as the study progresses.

Development of a Description of Initial Program Concept for TVI. Information from the study teams was analyzed against the original questions to provide decision makers and stakeholders with sufficient information to determine feasibility. This report contains sections to present the information compiled and analyzed, and is organized as follows:

- Needs Assessment
- Background/History of Advanced Technology Centers
- The Experience of Other Community Colleges
- Incorporating the CATT into TVI's Long-Range Plan
- Recommendations for Phase II: Plan

Section A: NEEDS ASSESSMENT

1. Labor Force Projections and Training.

By the year 2002, the population of the extended Albuquerque metropolitan area will be more than 631,000, with the west-side accounting for 59% of the growth. After 1996, area employment is expected to grow by approximately 2% per year until the year 2002. (Urban Growth Projections, 1992-2002, pp. 2-3.) (See population map for illustration of the City's Planning Information Area [PIA], on page 8.)

The New Mexico Department of Labor expects nearly 180,000 new jobs through the year 2005. Although the average growth rate in the state will be 29%, Albuquerque's growth rate is projected to be approximately 35%. NMDOL research states:

> Manufacturing employment will experience the strongest growth of any sector in New Mexico. The projected increase of 34.6%, contrasts sharply with national projections of continued employment declines in that sector. Manufacturing employment in New Mexico is expected to increase from 42,500 to 57,200 over the period, an increase of 14,700 jobs....The largest growth in manufacturing will occur in the electrical and electronic equipment sector, primarily due to increased manufacturing of computer-related equipment. This sector is expected to increase by 96 percent as an additional 7,200 jobs are created. (New Mexico 2005 Economic Projections, pp. 1-6.)

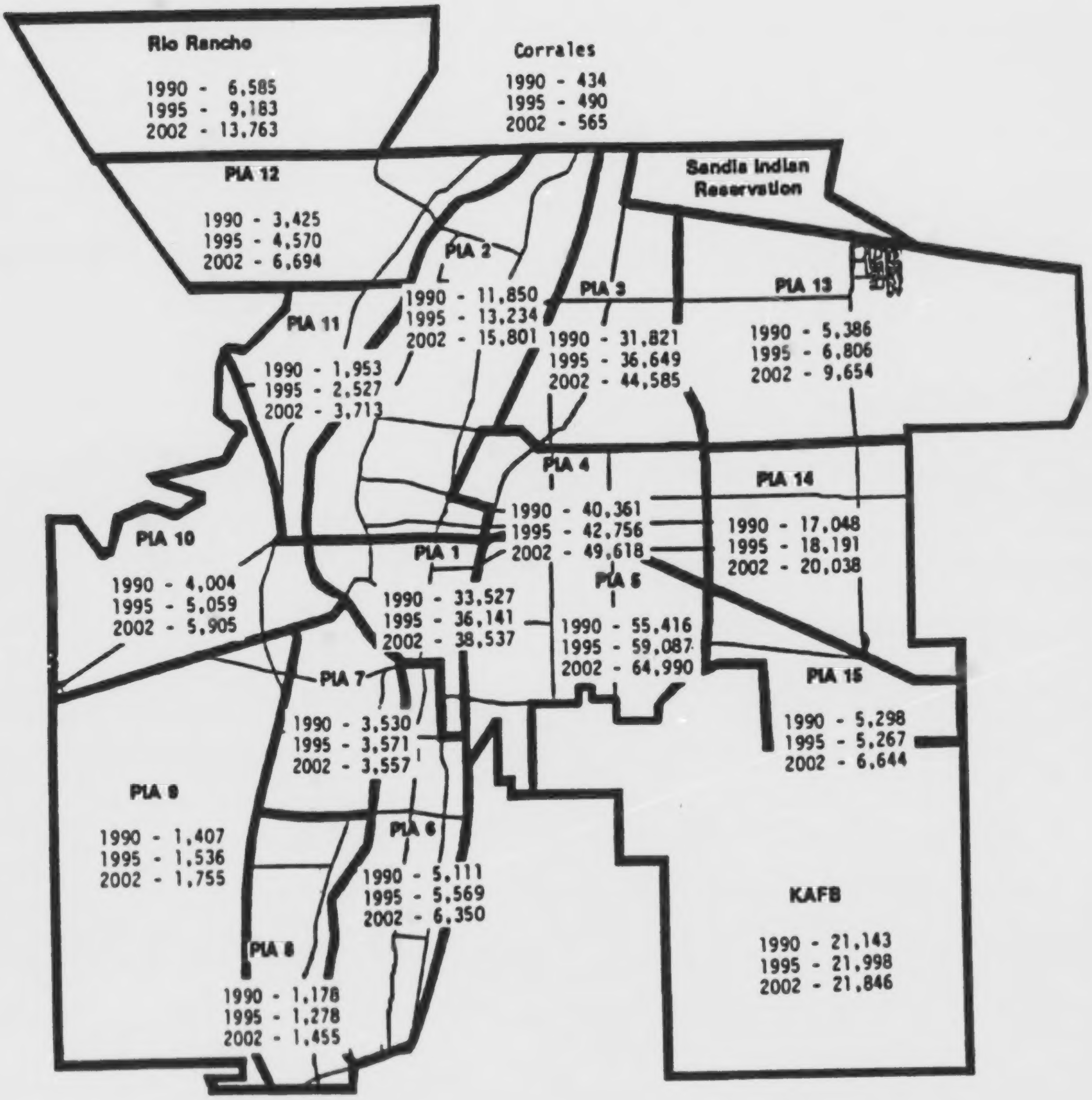
Manufacturing is the largest growth sector affected by technological change. The service sector is projected to be the second fastest-growing; and within that sector of the economy, health care is projected to be the fastest growing industry through the year 2005, creating over 19,000 jobs (see pp. 9 and 10).

A State Occupational Information Coordinating Committee report published jointly with NMDOL highlights some of the issues challenging the state's postsecondary institutions as they prepare students to enter the job markets of the future:

> Technological change, which requires a larger proportion of the labor force to be better educated and trained, will impact the future shape of employment. More competition, however, is anticipated for these technical jobs since they typically pay more....one out of five jobs will require vocational or technical education. (New Mexico Jobs for Graduates 1995, pp.4-5).

MAP 1.2

EMPLOYMENT BY PIA
1990 - 2002



JANUARY 1993
URBAN GROWTH PROJECTIONS
FOR ALBUQUERQUE & VICINITY
1992-2002 p.9

FASTEST GROWING INDUSTRIES*
NEW MEXICO. 1993-2005

Industry	Percent change 1993-2005
Communications Equipment	247.5
Machinery, Equipment, and Supplies	150.4
Measuring and Controlling Devices	133.7
Nonstore Retailers - Vending	97.8
Electronic & Other Electrical Equipment	96.0
Research and Testing Services	84.9
Offices of Other Health Practitioners	82.1
Home Health Care Services	78.4
Instruments and Related Products	70.0
Personnel Supply Services	69.0

* Industries with over 1,000 workers

New Mexico 2005
Economic Projections p.6

The studies of labor force projections focused on new jobs, on the expansion of opportunities for graduates, a need addressed by TVI's associate degree programs. (See appendix C.)

It was clear, however, that what the studies did not address is the critical issue they raised: the increasing demands placed on the TVI curriculum by technological change. Additional questions were raised: How will TVI keep faculty trained to incorporate technological change? How will current workers, even those who are newly hired, get the skills to use new technology as rapidly as employers need to make changes? What about the needs of new and existing small businesses, suppliers, those related to the new industries coming to the community, who also have to keep their work force current with technological change? In short, how will TVI remain prepared to actively participate in the anticipated growth of jobs being created and overall economic development?

2. New and Changing Jobs; Keeping Pace with Technology.

In order to answer these questions, the study teams listened to business and industry representatives' ideas about the concept of the Center for Advanced Technology Training.

There is no doubt, and the point was well made during discussions with business leaders--as Bob Hoffman from Albuquerque Economic Development put it, "Albuquerque economic development must continue to raise per capita income in the way that industries such as General Mills, Intel, Motorola, and Philips have already done." Motorola Vice President Doug Bosomworth extended the discussion:

> "We have to expand and improve the capabilities of the area work force and the biggest demand is for skills in manufacturing or technological environments. A good work force is an asset to existing companies and does attract new companies...But equipment and processes change in less than six months, and new, specific applications have to be taught to keep industry moving."

Carol Radosevich, PNM Economic Development Director, summarized the points made consistently by the business representatives contacted during the interviews for the study:

> "There has to be fast, customized training. Some training could include broad-ranged information, incorporate team practices, interpersonal relationships, responsibility and initiative. But it must be an on-point curriculum, a timely, cost-effective way to meet business needs. There must be a quick response for expanding, relocating, re-educating people."

Jim Goins, Plant Manager of General Mills provided extensive insight from his perspective, including the following comments:

> "TVI's campuses are full. A large hiring class or large group of employees would be scattered. There is not enough space to put in the equipment companies will need to get the best training, the most use of their training.
>
> We were building our building, so we couldn't train in our facility. We did some training at Montoya Campus but could have used a bigger space. General Mills could do some of our advanced technology training in a facility like this.
>
> This center will be cost-effective for industry. Honeywell, Intel, General Mills and others each train employees in, for example, statistics. This place could have an industrial statistics course--that would be a real benefit to me because I don't need to hire my own instructor and find my own materials, etc. Each company might have a different way of drawing conclusions or using the information, but the basic principles would be the same. And there are a significant number of other areas--conflict management, business communication--that could all be combined into this center. It would be a benefit to all of us.
>
> TVI should do this project because it is the technical-vocational institute in this city. It has a history of technical education, it fits with our [TVI] charter more than any other school. Other institutions could do it, but they would have to shift their focus to technology education. TVI is already tuned into it.
>
> We need to attract new business because jobs fuel the whole economy. Albuquerque has always been short on high class jobs. People are employed but not in these kinds of jobs which require a higher class of training."

Leroy Pacheco, President of the Hispano Chamber of Commerce, added to the discussion about existing businesses, noting that although the state In-plant Training Program provides a resource for training for some new businesses, it does not help existing small entrepreneurs keep pace with changes essential if they are to supply the related services required for overall economic development.

Carroll Cagel is working closely with Philips Semiconductors and other major manufacturers in the community. He explained that the recently formed Technology Industry Association is also concerned that there be attention to the needs of all sized businesses and industries. The group suggests a two-tiered approach to program planning: (1) 90% of the training should be generic to the industry and meet the needs of all related employers; (2) 10% should be adapted specifically to clusters of employers. For example: semiconductors affect only a few employers, but a large number of employees--on the other hand, lasers are important to many employees, but only a small number of employers. Mr. Cagel also noted the need to build a link with Albuquerque Public Schools so that Tech Prep students could get hands-on experience and knowledge of the jobs for which industry is hiring, training, and retraining.

Without exception, business representatives involved in the needs assessment stated that curriculum must be (1) industry-driven to industry standards (2) able to provide rapid response (3) an intensive format (4) short-term and flexibly scheduled, and (5) use equipment, materials, and processes that change multiple times during any given year. They concurred that the training must be *hands-on, applied, not theoretical.* They suggested that industry and TVI would have to be partners in conducting training, with industry involved in deciding what was taught and sharing training responsibilities with faculty. Pat Foy, Southwest Region Training Manager, for Intel, repeatedly noted that such a partnership would allow faculty to increase their skills with new technology quickly, then infuse what they have learned at the CATT into their regular courses at TVI.

Quality Control Manager Marshall Suarez, summed the initial needs of Motorola this way:

> **"As the manufacturing community in Albuquerque grows, the need for high quality labor will become more important. This situation will become even more critical for the following reasons: first, the demand for qualified employees is growing faster than the population and secondly, as manufacturing becomes more technical the qualified pool will get smaller. The establishment of a high tech manufacturing center at TVI would help mitigate our future labor pool concerns.**
>
> Motorola Ceramic Products Division would encourage TVI in this endeavor if the center would provide an increase in the qualified manufacturing labor pool. This could be accomplished if the High Tech Center would provide basic manufacturing skills that are generic or usable by all local manufacturing concerns. An applicant with a working knowledge of the following skills and abilities would assist the industry by providing an employee who would become productive faster.
>
> BASIC SKILLS
> Manufacturing Mathematics
> Technical Writing and Reading Abilities
>
> HUMAN RELATIONS SKILLS
> Interpersonal Communication Skills
> Team Building Skills
>
> QUALITY MANUFACTURING SKILLS
> Statistical Process Control
> Use of Gages and Measuring Devices
> Process Mapping and Cycle Time Management
> Total Customer Satisfaction Skills
>
> INDUSTRIAL SAFETY
> General Manufacturing Safety Principles
> Basic First Aid and CPR
> Handling of Hazardous Materials
>
> BASIC MANUFACTURING SKILLS
> Automated Production Lines
> Operation of Basic Production Equipment
> Packing and Shipping
> Manufacturing Computer Skills
>
> A labor force with the above skills would greatly assist the current manufacturing community and would also be a positive incentive for new industry to relocate to this area."

The process of the feasibility study resulted in a clear picture that there is a gap in TVI's current ability to meet the needs of a growing economy and simultaneous rapid pace of the technological change affecting area businesses and industry. There are implications for associate degree programs; however, the requirements identified in the needs assessment call for a new response from TVI. The concept of a Center for Advanced Technology Training appears to be a viable, innovative means of addressing these identified needs.

To bring focus to the concept of such a center, information was compiled through Internet search and direct contact with community colleges and organizations nationwide to determine their experience in establishing and operating advanced technology training centers.

Section B: BACKGROUND/HISTORY OF ADVANCED TECHNOLOGY CENTERS

Arriving on the scene in the 1980s, the earliest advanced technology centers emerged in regions where community colleges were included in aggressive local economic and community development activities. The services they provided were either directly linked to applications of technology in the region or strongly related to applications of technology that industrial prospects or economic developers need. Advanced technology centers provided an education/training and human capital that resource developers needed to support the business/community climate (Ernst & Johnson, p. 34).

1. Community College Programs Compared with University Programs

Throughout the country, community college advanced technology centers' roles in economic development are quite different from that of research universities. The community college centers are linked directly to aspects of economic growth associated with applications of technology in their service region. They are intended to increase

the number of jobs; the technical skills of employees; productivity, quality, and competitiveness; and the overall economic health of the region. Their ability to respond rapidly to train potential employees attracts new businesses and enables quick retraining that encourages the expansion of existing businesses and industry (Ernst & Johnson, p. 28).

Al Lorenzo, President of Malcomb Community College, in his analysis of the evolving community college mission (1991), identified "communities as clients" and discussed several ways in which community colleges are accepting expanded responsibilities in areas such as economic development and community partnerships. The availability of appropriate educational opportunities is now the single most important factor considered by businesses which plan to relocate (Ernst & Johnson, p. 28).

Nationwide universities also have increased their involvement in economic development activity, helping businesses through technology transfer, research and applied technical assistance. As noted in many states:

> Communities have much to gain from a research-oriented university in their midst. Although localities in general lack the financial wherewithal to support university research projects, communities can draw on such research in marketing their communities and strategically planning their economic futures (Engelking 1992).

The University of New Mexico has established a Manufacturing Training and Technology Center which will provide a teaching center for engineers, managers, researchers, as well as the highest level technical personnel in the industry. The UNM center will be a focal point for Sandia, Philips and Los Alamos Laboratories to work with UNM faculty in research and development, providing a prototyping facility as technology advances.

TVI Dean Phil Callow anticipates that the Technologies Department will work closely with the UNM center as new concepts, course materials and laboratory exercises are developed to help students make the transition from TVI to UNM baccalaureate programs. This linkage would be beneficial to approximately 10% of TVI computer programming and electronics graduates, affording them valuable experiences for advanced degrees.

The CATT would be distinct from the UNM program, although TVI would benefit from both activities. The CATT would operate within TVI's mission, focusing on training and retraining technicians, on hands-on application of new techniques, processes, and equipment being used by industry, and keeping employees current with the demands of their jobs.

2. The Implementation of Centers for Advanced Technology Training

At one extreme, the advanced technology center is a huge complex with enormous investments in modern manufacturing and instructional equipment. Some advanced technology centers do not own equipment (other than computers), but do "just in time training" for industry using equipment the industry brings to the center temporarily to use for the training. At the other extreme, the advanced technology center may be a small, competent staff that relies on alliances and partnerships with business and industry to meet local training needs. Regardless of where centers fall on the spectrum, they all have one thing in common--each represents a significant commitment of resources to work force development and industrial modernization for the region it serves (NCATC Proposal to the Nation, p. 4).

The study team compiled data received from twenty-two community colleges in response to a TVI survey. The following table indicates those which operate using their existing facilities, courses, and faculty; and those which operate with separate centers.

Oregon--Advanced Technology Center--Wilsonville, Oregon	X				
Minnesota--Minnesota Center for Academic Technology and Technology Learning Center--Inver Hills Community College		X			
Total	9	10	1 (with stand alone also)	2	1

*Descriptions:

● Stand alone	Technology center and teaching center that offers non-credit courses, credit courses, on-site and off-site training, laboratories, partnerships with industry, may be partnerships with other institutions, conference rooms, classrooms, hub for modernizing industry through training, college faculty, contractors, and consultants
● Within college	Training and re-training through community college facilities, non-credit and credit courses, community college faculty, contractors, and consultants
● Incubator	New business start-ups, training for new business, house new businesses for a period of time then businesses move out to gain further independence
● Extension	Agents and trainers help firms modernize and improve productivity through new technology and management practices, may be housed at college or in regional centers around the state
● Broker	An office may respond to business as needed and become a catalyst for training needs through courses and on-site or off-site training

matrix

Some advanced technology centers specialize in automation control systems, computer *integrated manufacturing, and special application technologies. Others focus their efforts on* total improvement audits, statistical process control, the design of experiments, prototype part production, and the like. Collectively, advanced technology centers may represent the only working prototypes of "the ideal" industry training program for preparing companies for the total quality, globally competitive journey (NCATC Proposal to the Nation, p. 5).

Variables that relate directly to advanced technology center impact include:

* Growth in numbers of jobs with new, different & emerging skill-set requirements

* Increases in wage levels

* Quality improvements in products

* Productivity increases

* Industrial expansions

* New technologies, processes, or products

* New companies moving into the area

* Improvements in the image of the region

* Overall economic growth of the region

* Companies and/or job retraining

It is a common view of those involved with an advanced technology center, that if they are to contribute to economic and community development initiatives in the future, they must continue to develop the partnerships they have begun with other educational institutions, business, industry, labor, economic development organizations, and their communities. They must be champions of change and demonstrate that they can handle change effectively in meeting the needs of employers (Ernst & Johnson, pp. 30-35).

Section C. THE EXPERIENCE OF OTHER COMMUNITY COLLEGES:

1. The National Coalition of Advanced Technology Centers (a summary from the NCATC Proposal to the Nation.)

In 1988, with the help of the Tennessee Valley Authority and the Center for Occupational Research and Development, nine institutions operating advanced technology centers formed the National Coalition of Advanced Technology Centers on the premise that community colleges can and do have a role in helping America's industry and work force keep pace with new technology.

Today, the NCATC has more than 70 center and associate member institutions. The membership primarily consists of two-year community, technical and junior colleges from urban, suburban, and rural settings in more than 30 states. Geographic representation is well distributed from Massachusetts to Hawaii.

It could be said that NCATC *member institutions have created a new paradigm for educating and training the industrial work force of America.* These institutions have embraced the opportunity to collaborate with the private sector, and have developed advanced technology training and demonstration centers that introduce new applications of technology, demonstrate the feasibility of technical innovations, test and evaluate prototype workcell configurations, train and retrain existing workers as well as displaced employees, and generally develop the foundation skills needed by progressive companies to reduce their costs and remain competitive.

To help define the role of community and technical colleges in this process, the NCATC has developed a proposal to the nation, suggesting that NCATC members: (1) lead the establishment of training programs for high skill workplace; (2) be the first choice to develop college extension programs in industrial and manufacturing technology; (3) facilitate the transition of science and math students from associate to baccalaureate degree

granting institutions; (4) support small businesses by functioning as manufacturing training centers; (5) serve as test-beds for a national apprenticeship program; (6) provide continuous improvement training, including quality management training, for workers and companies; and (7) foster manufacturing partnerships and consortia.

When NCATC organized, one of its most challenging tasks was defining the term "advanced technology center." The founding members intentionally avoided a definition that implied a certain facility, choosing instead to emphasize function. They concluded that an **advanced technology center is an advanced technology application and training mechanism established by a two-year postsecondary institution to support economic competitiveness by providing education, training, and consultation services that promote greater awareness and use of advanced technology.**

NCATC selected as the purpose of their organization "to position community, junior, and technical college advanced technology centers as a primary deliverer of technology training and technology transfer to ensure the competitive posture of American industry in the global economy." A recent survey of NCATC members revealed they were delivering training or retraining programs in the following areas:

* Design
* Manufacturing
* Materials science
* Hazardous materials
* Telecommunications
* Electro-optics
* Medical technologies
* Office automation
* Management

2. The Roles of Advanced Technology Centers

Advanced technology centers can furnish services ranging from professional development to computer programming for the rest of the college. It is important to note that the advanced technology centers need not have a recognized authority on the technology in order to sponsor one of their seminars. The center may simply coordinate the event and bring in an expert to provide most of the technical training. Training seminars may last from half a day to several days. (Ernst & Johnson, p. 21.)

A two-page summary of information received from each community college which responded to the TVI study team survey is included in the appendices. Variation in program and course definitions offers multiple perspectives for technological training and retraining for increased productivity and competitiveness in the global market. This information will be incorporated into the work of detailed program and facility planning in Phase II of this study.

It is clear that for the CATT program to be designed to incorporate the experience of other institutions, there must be additional visits to potentially replicable sites in order to have an accurate understanding of program and operational specifics.

Section D: INCORPORATING CATT INTO TVI'S LONG-RANGE PLANNING

The Mission Statement of TVI states,

> *The primary mission of the Institute is occupational education. To achieve its primary mission, the Institute plans and provides an occupational curriculum to enable each student to gain definable job skills consistent with work force needs of the nation, state and communities of New Mexico.*

Two of the listed goals following the mission statement are directly related to the concept of an advanced technology center:

> *TVI Goal 1. The Institute, consistent with work force needs, will offer relevant, occupationally oriented, postsecondary education to develop its students to the desired level of competence.*

The Center for Advanced Technology Training would enable faculty to be retrained as technology changes. The training they receive in the CATT would not only keep them professionally current, but would also result in appropriate changes in their regular credit programs leading to occupational associate degrees.

> *TVI Goal 7. The Institute will work with businesses, government and other institutions to support the economic development of the community.*

The Center for Advanced Technology Training would be a true partnership for economic development, as it would operate in close collaboration with businesses and industries as curriculum is developed and classes taught. Additionally, the CATT would be responsive to area economic development plans to attract new businesses and encourage expansion of existing businesses.

Within the TVI Five Year Plan 1994-1999, a major barrier is noted that would be addressed by the CATT:

> As technology changes rapidly, equipment for the Institute's programs must be updated. Although costly, equipment updating is necessary to keep programs current with industry. (p.8)

The CATT will not resolve the need to keep equipment in the regular instructional program as current as possible; however, it will provide a means for access to state-of-the-art equipment to rapidly respond to the immediate needs of changing technology when employers must retrain their work force. It would also provide large space not now available anywhere at TVI, but needed to accommodate some high tech equipment.

This feasibility study makes clear the need for consideration of the impact of technology and area economic development planning in the TVI Five Year Plan, particularly in analysis of external environments. Further, the CATT would enhance the institutional environment described in the current five year plan, which states that "Albuquerque employers view TVI as a major source of educated and skilled workers" and "The Institute responds rapidly to business and industry for employee training and upgrading."

TVI's current ability to provide employee training and upgrading is through its credit bearing programs, augmented by the Office of Contract Training, Continuing Education Studies, and the Small Business Development Center. The three primarily non-credit programs currently operating at TVI also require rapid response capacity and the ability to assess the needs of businesses and individuals seeking training and retraining:

- TVI Continuing Education Studies is currently offering a range of courses from AutoCAD to "Upgrading Your PC." Program data indicate that the most successful of these short-term courses are those that related to improving technical skills: Windows, Excel, Powerpoint, Computer Literacy, Desktop Publishing, Internet, and UNIX. A major consideration of the CATT program would be to refocus these efforts to provide emphasis on all technological changes and professional development needs of individuals in the community seeking to enter employment in participating and related industries supported by the CATT.
- TVI Contract Training is a self-sustaining office which generated contracts with more than 50 different area employers (many of which were renewed as a result of employer satisfaction) during 1994-1995. Ranging from large to small businesses, the contracts provide for training in areas as diversified as: Gender Harassment, Legal Issues in the Workplace, Special Welding Training for Technicians, and AutoCAD, etc. These services continue to be essential to economic growth and business competitiveness; therefore, the Contract Training Office should be located in the CATT to continue to provide an educational link between businesses, government agencies, and nonprofit organizations.

- TVI's Small Business Development Center is funded by grants and must meet their requirements to assist existing and potential small businesses. Some of the training workshops offered to the small business community could be refocused to provide information essential to increasing the skills of business which provide products and services directly related to the industries on which the CATT focuses.

All three of the highlighted existing TVI programs could be located within the CATT, providing them with linkages and support that would strengthen their offerings to the community, provide the foundation for enhancing the development of the CATT, and the facilities, staffing, and networking essential to their expansion.

Section E: RECOMMENDATIONS FOR PHASE II: CATT IMPLEMENTATION PLAN

The experience of other community colleges provided the foundation for developing recommendations regarding the next phase of study. The following is a summary of the suggestions by Ernst & Johnson in a recent AACC Journal:

1. Planning/Directing/Launching An Advanced Technology Center

Once basic directions have been established, thereby clarifying the parameters of a community college's interactions with business and industry, the college itself must marshal its existing resources and create new ones to provide the expertise and facilities necessary for advanced training. Most advanced technology center directors agree that the single most critical factor in the creation and operation of an advanced technology center is the commitment and vision of the college president. TVI is fortunate to have a president fully supportive and who in fact brought the idea up as part of his vision for the college.

The successful launch of an advanced technology center also depends on careful plans for budgeting, finding funding, and acquiring staff. Full-time faculty, who tend to be the keepers of both curriculum quality and of facilities, are often given opportunities to design the training programs for business and industry to assure the best pedagogical approach and articulation with their credit courses and programs. These faculty are also used as consultants for industry, actually going on sales calls and analyzing the needs of the client businesses. Finally, they are called upon to teach courses and find qualified part-time faculty, who in turn improved their own skills.

To avoid unnecessary expenditures and to develop the most appropriate advanced technology center for its local needs, a college should draw on as many resources as possible. College officials should tap the expertise of their local business community.

After receiving board approval to pursue preliminary work, most institutions create a planning committee. The planning committee includes executives and technical experts from local industries, leaders who can provide guidance in the types of services that the advanced technology center should provide. Also included are college representatives from the likely areas of instruction and the offices of research, planning, and development; economic development; and public communications.

2. Visiting Other Community College Advanced Technology Centers

Visiting other advanced technology center sites is crucial to providing the foundation of advanced technology center components which become models for one's own community. For example, one project's major purposes was to better familiarize community leaders with the important role community colleges can play in meeting a state's economic development objectives. Five different model site teams visited 22 community colleges between March and July of 1989. Each advanced technology center was found to have its own distinctive character that was grounded in identified community needs. Information collected from the model site visit project was used in the larger strategic planning and implementation process that led to the creation of Salt Lake's advanced technology center.

3. Acquiring Staff or Retraining Current Staff

The advanced technology center needs to be staffed by flexible and creative people who are willing to get on the shop floor and work with industry. They must understand that their jobs will be contingent on constant upgrading of personal skills.

Finding, recruiting, and retaining qualified staff is one of the greatest challenges an advanced technology center director faces. In general, the salaries that will be necessary to attract and keep good employees will exceed those typically offered by the college.

4. Networking

Advanced technology centers should never operate alone. The advanced technology center is part of a college, a community, a state and a nation. It should work as a team player with other agencies and organizations in meeting industry's needs. Often the center may collaborate with a university.

If the advanced technology center expects to be treated as a team player, it must show a commitment to collaboration. Approximately 70 institutions are members of the National Coalition of Advanced Technology Centers.

5. Maintaining and Upgrading the Advanced Technology Center

An advanced technology center will be relevant only as long as it provides services useful to industry. As technology marches forward, the center must make appropriate modifications to its equipment and services. The 1990s may well become the major industrial automation decade as more and more companies turn to technology and automation. On every front there will be considerable emphasis on developing high performance and high-skill work organizations as our nation refocuses to stay in the international economic market.

It is now desirable for communities to have two-year colleges that operate advanced technology centers offering broad but well-focused programs of short-term and continuous training to assure investors that human capital resource needs can be handled, according to Harry A. Martin, president of the Community Development Foundation of Tupelo, Mississippi. Industrial prospects like to see the community college included in local economic and community development partnerships. Statistics often do not show a college's impact on the community as a whole, since conventional credit and community education programs are justifiable in terms of improving the quality of life for individuals, even if the demonstrable impact on economic or industrial growth happens to be minimal.

Advanced technology centers have focused on traditional manufacturing industries and have little activity with processing industries, such as chemicals and petroleum materials, or with paper, wood products, furniture, textiles, or food products. The health field makes up a large part of the economy compared to other industries, and since technology is extensively used in the health-care field, it is possible that advanced technology center could play a larger role in supporting those technical needs.

Based on this summary of experience from other centers and college, Section F recommends next steps for TVI.

Section F: RECOMMENDATIONS FOR NEXT STEPS

Two teams should be assigned to develop detailed and specific plans and timelines for implementation:

Team 4: FISCAL/MANAGEMENT PLAN

Assignments:
- prepare detailed cost analysis for implementation and ongoing operations
- prepare projections for long-range operation
- prepare detailed analysis of resource alternatives
- recommend management structure in relation to TVI administration
- recommend staffing arrangement; job requirements

Team 5: PROGRAM/FACILITY PLAN

Assignments:
- draft syllabi for generic training
- describe faculty/trainer qualifications and sources
- describe space/facility requirements
- describe equipment requirements

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Alabama
California
Colorado
Illinois
Iowa
Kansas
Maryland
Michigan
Minnesota
Missouri
New Jersey
Ohio
Oregon
Tennessee
Texas
Washington
Wisconsin

ALBUQUERQUE TECHNICAL-VOCATIONAL INSTITUTE

9921

T-VI

A Community College

GOVERNING BOARD
Resolution 1995-34

Whereas, a center for advanced technology training would provide New Mexico businesses with services such as human resource training, customized training, small business development, advanced manufacturing training, workforce needs assessment, enhanced technical education, and contract procurement assistance; and

Whereas, a center for advanced technology training would enable T-VI to significantly enhance its ability to support economic development and the attraction of new businesses; and

Whereas, a center for advanced technology training would enable T-VI to leverage grants in a number of fields and, thereby, increase its ability to respond to needs of the business community; and

Whereas, a center for advanced technology training would play a significant role in attracting new businesses to New Mexico; and

Whereas a center for advanced technology training would provide necessary and affordable assistance for existing businesses to remain successful; and

Whereas, neither Albuquerque or the state currently have the capability to provide such comprehensive services; and

Whereas, the Governing Board Property Acquisition Committee had reviewed and endorsed the concept and preliminary plans for a center for advanced technology training; now, therefore, be it

RESOLVED, That the Governing Board of the Albuquerque Technical-Vocational Institute directs administration to conduct a feasibility study for a center for advanced technology training and to incorporate the study into the Institute's five-year plan; and, be it further

RESOLVED, That the Governing Board of the Albuquerque Technical-Vocational Institute directs administration to actively explore funding sources for such a center.

ADOPTED, This 13th day of June, 1995.

APPROVED:

Chair

ATTEST:

Patrick Chapman

Secretary

PRESIDENT
Alex A. Sanchez, Ed.D.

GOVERNING BOARD
David F. Cargo, Chair
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Patrick Chapman, Secretary

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PHASE II

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PHASE II: IMPLEMENTATION PLAN

- PROGRAM DESIGN
- MANAGEMENT AND ORGANIZATION
- FISCAL IMPLICATIONS
- FACILITY/LOCATION OPTIONS

INTRODUCTION

The following are the assumptions drawn from the first phase of the Feasibility Study:

1. Manufacturing and related businesses are the largest portion of Albuquerque area growth.
2. Manufacturers require training that is (1) industry-driven to industry standards, (2) able to respond rapidly to changing equipment, materials and processes, (3) intensive, short-term and flexibly scheduled, (4) hands-on, applied, not theoretical.
3. There are many small to medium-sized businesses related to the manufacturing sector which require a pool of trained people to remain competitive and contribute to area economic development.
4. Area business and industry, as well as the government sector, consider the proposed TVI Center for Advanced Technology Training (CATT) to be a viable, innovative means of addressing training to attract new businesses and encourage expansion of existing businesses.

PHASE II METHODOLOGY

The second phase continued as an evolving study, combining data from several sources and analyzing information from the perspectives of the business community and city professionals, as well as TVI administrators. The team approach which proved successful as a study method during Phase I was continued, with the teams organized as subteams assigned to examine the interrelated issues for planning. Teams held overlapping meetings and exchanged information through the study coordinator, Ruth Tangman.

Program Subteam:

Phil Callow, Dean of Technologies
Joe Rodman, Dean of Trades & Service Occupations
Deborah Cordier, Development Training Manager, Philips Semiconductors
William Alzheimer, Director, Manufacturing Technology, Sandia National Laboratories
Deidre Firth, Albuquerque Economic Development
Marshall Suarez, Quality Manager, Motorola
Carroll Cagle & Richard Chapman, for Technology Manufacturers Association

Assignment: Design a program of initial generic/core classes to meet business/industry needs, identifying those which may be appropriate for small to mid-sized companies. Develop a plan for ongoing involvement of employers in determining instruction to be offered.

Tasks:

1. Review instructional offerings of comparable advanced technology training centers and compile syllabi of those appropriate to the generic classes for the CATT.
2. Review TVI syllabi, including those from non-credit instruction and contract training, and compile those appropriate to CATT generic classes.
3. Draft recommendations for ongoing, systematic involvement of business/industry in generic training needs and effectiveness assessment.

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Management and Staffing Subteam:

Richard Birkey, Assistant Dean, Trades & Service Occupations
Donalinda Ace, Director, Contract Training Office
Roslyn Block, Director, Small Business Development Center
Harold Washington, Director, Continuing Education Studies
Phil Callow, Dean of Technologies
Joe Rodman, Dean of Trades & Service Occupations
Sue Kline, Human Resources Representative

Assignment: Analyze potential staffing patterns for operating a center and develop recommendations for the TVI CATT initial staffing, management, and relationship to the overall TVI administrative structure.

Tasks:

1. Review current job descriptions of personnel in Continuing Education Studies, the Contract Training Office, and the Small Business Development Center to draft any revisions necessary to refocus their responsibilities as part of the CATT.
2. Analyze support staff needs for the total CATT, including the program functions that may be transferred from CES, CTO, and SBDC, and draft recommendations (with justifications) for additional support personnel at the CATT.
3. Analyze the TVI administrative structure, including major committees and draft recommendations for an appropriate linkage between the CATT and TVI operations.

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Cost Analysis Subteam:

Lois Carlson, Dean, Business Occupations
Carl Alongi, Pulakos and Alongi Ltd. . .
Jerry Pacheco, Vice President, Norwest Bank
Cliff Schneider, Vice President, Norwest Bank

Assignment: Analyze cost for CATT start-up, ongoing operation, and long-range projections (including projected revenues, as well as expenditures). Draft accompanying budget documents an recommendations for potential sources of funding for start-up and ongoing operation with projection to self-sustaining status.

Tasks:

1. Review budget documentation from other centers, TVI budget for current related programs, and cost information from Subteams studying personnel (management & staffing) and facilities.
2. Develop model budgets and draft recommendations for cost-effective operation.

Facility Subteam:

Phil Callow, Dean of Technologies
Joe Rodman, Dean of Trades & Service Occupations
Dale Dekker, President, Dekker/Perich Associates, PC
Carol Radosevich, Director, Economic Development,
Public Service Company of New Mexico
Pat Foy, Southwest Region Manager, Workforce
Development, Intel
John Lorio, engineer, Industry Network Corporation
Erik Pfeiffer, Economic Development Officer
City of Albuquerque

Assignment: Develop options for space and equipment to support the CATT. Draft recommendations for facility location.

Tasks:

1. Examine floor plans an space use information from comparable advanced technology centers. Determine the space requirements to support the CATT program.
2. Consider available facilities and new construction.
3. Draft recommendations regarding facility for the CATT.

Section A: PROGRAM DESIGN

Analysis of Data and Information:

Phase I of the study identified 7 programmatic models used by community colleges across the country to contribute to economic development (see Phase I report appendices):

1. **Industry Hub/Service Center**

Industry-driven training in a central location, including opportunity for small to medium-sized enterprises (SME) to acquire specialized information and service to meet a range of needs; sometimes dubbed "technological observatories" because they allow SMEs to scan information about new development in markets, techniques and technologies. (e.g.: San Diego Community College).

2. **Teaching Factories**

   A critical mass of firms with common technology needs, sufficient demand, and long-term support. A combination of a shared facility (SMEs pay for shared use of advanced technologies) and simulated factors established by industries in Germany to train skilled employees. Vendors place advanced technologies in a teaching factory before adoption in order to train employees and work out the bugs. (e.g.: Milwaukee Area Technology College & Germany's Fraunhofer Society).

3. **Incubators/analysts**

   The college is a catalyst for increasing state/federal investments in industry modernization. A center which begins as part of the college becomes administered completely independently. (e.g.: Gadsden State Community College, Alabama; Macomb Community College, Michigan).

4. **Outreach Offices/Extension Services**

   Technology extension agents, working with universities, become change agents and advisory for industry, helping firms evaluate their operations and make plans for a productive future. (e.g.: Milwaukee Area Technical college; California Community College System).

5. **Educators/Gateways to Work**

   College working to improve curriculum; special efforts to attract high school youth into technology programs; emphasis on underrepresented populations. (e.g.: Texas State Technical College, Waco).

6. **Customized/Certified Trainers**

A combination of training to meet the needs of large, new or expanding industries and also help companies with similar needs to form a training network or provide training through clusters where small business employees are trained collectively. (e.g.: Pikes Peak Community College, Colorado; August Technical College, Georgia; Monroe Community College, New York).

7. **Brokers/Facilitators**

College serves as information broker for SMEs to find appropriate service providers, i.e., one-stop shopping; college brings together companies to build an infrastructure for cost-sharing, deal-making, inter-firm learning. (e.g.: Oregon Advanced Technology Consortium).

Study Team Analysis of Models Compared with TVI Programs:

The study team worked from a matrix of the 7 models and aligned current TVI related instruction/ services against the models. They found that some existing TVI programs provide some elements of several of the models:

- Contract Training customized courses for primarily large and mid-sized employers;
- Continuing Education Studies workshops for individuals, which are frequently attended by employees from small companies and those seeking to upgrade their employment;
- Small Business Development Center workshops for small employers and new businesses;
- In-plant Training for new employers and those expanding their scope of work.

The team composed of manufacturing industry representatives and TVI administrators then identified gaps in instruction/ services which could be addressed by the CATT:

- the difficulties of SMEs in obtaining funding to pay for training small numbers of employees;
- the duplication of training needs among employers of all sizes;
- the lack of large space and flexible labs to serve fluctuating industry needs;
- the need for faculty to train focused on industry standards, rather than traditional education approaches;
- the need to link training directly to expensive and changing equipment and procedures.

Through analysis and discussion of the models, it became clear that by focusing on the training for specific skills to meet industry standards, as well as making training more flexibly available, short-term and intensive, TVI's apprenticeship programs and courses for APS-TVI Associate Degree Prep (Tech Prep) students could better prepare students planning to enter manufacturing jobs. TVI associate degree students transferring to UNM and UNM students entering the workforce could benefit through collaborative arrangements with the UNM Manufacturing Technology Center, providing hands-on applications before they begin working in industry.

The study team also found that linkages between these TVI programs and other agencies could be brought closer together to provide increased and strengthened training opportunities for manufacturers, e.g. collaboration with the Industry Network Corporation. Subsequently, a focus group was held by the Technology Manufacturers Association to gather input for generic/core classes from a range of small, medium, and large sized employers in the manufacturing sector. Technology Industry Associations who attended the Workforce Development Focus Group meeting on September 1, 1995, included representatives of BDM, Motorola, Intel, Philips, Lasertechnics, Allied Signal, MIOX, and Cagle and Associates. Two of their major findings included the following:

- Stated their strong interest in the proposed CATT program and anticipate sustained participation.
- Will be actively involved in the process as co-creators with TVI in establishing and maintaining the CATT program, rather than serving in an advisory role.

The following program design was developed as a starting point, recognizing that specific courses will need to be revisited at the time the CATT becomes reality and continually as the center operates.

Initial Design of the CATT Program:

The concept of the CATT will incorporate the features of four of the models identified in Phase I of the feasibility study:

- **Industry Hub/Service Center**
- **Customized/Certified Trainers**
- **Incubators/Catalysts**
- **Educators/Gateways to Work**

Through linkages with other agencies through the SBDC, Industry Network Corporation, and the Technology Manufacturers Association, there will be an opportunity to provide outreach/extension services and serve as brokers/facilitators, as well.

The TVI comprehensive CATT will focus initially on the greater Albuquerque metropolitan area manufacturing sector, providing instruction in new techniques and technology applications. The CATT will operate as a partnership among TVI and employers of all sizes, providing:

(1) employee training/retraining; agile, specific, customized classes tailored with and monitored by stakeholders;

(2) clusters of training, information and services to meet a range of needs for employers in related businesses, as well as small business incubator services;

(3) teacher/retraining and support for use technology for teaching and learning curricula updating in area high schools, as well as TVI; and

(4) short-term training to supplement selected high school and apprenticeship instruction (e.g. Tech Prep/Apprenticeship/School-to-Work).

Each program component is explained below:

1. **Employee training/retraining.** Instruction will be designed and developed with each employer or group of employers as requested and scheduled to meet work schedules of the employers. There will be a distinct difference from traditional "education," because this training will focus on true business results -- the purpose will be to increase productivity, reduce costs, upgrade measurable skills and performance. Those participating in training will learn to operate specific pieces of equipment and use specific procedures. Classes will be highly tailored and offered only in response to requests directly from specific businesses or from outreach organizations seeking to recruit new businesses to the area, e.g. Albuquerque Economic Development. The training may be held in computer labs, flexible classrooms (capable of converting from small to large group instruction), and/or in the area designed for equipment specific to the industry.

2. **Clusters of training will be generic/core classes needed by the range of manufacturing employers in the Albuquerque area.** The content of this training will be based on continual assessment of industry training needs. Given the rapid pace of change in the manufacturing sector, surveys will simply slow the process of

responding. Therefore, the focus group organized by the Technology Manufactures Association will meet frequently to determine needs for new instruction and changes required to keep classes current with their specifications. CATT professional staff and trainers will enlist the members of the Association, as well as industry training staff, to continually monitor each cluster, maintaining interactive communication to assure training matches specific work requirements.

Although it is recognized that the classes offered can be expected to change frequently, the following EXAMPLES are provided from the focus group, to illustrate the types of "generic" instruction expected from the CATT:

CLUSTER CATEGORY	CLASS EXAMPLES
World Class Manufacturing	- Just In Time Inventory Management
	- Electronic Data Interchange
	- Statistical Process Control
	- Total Quality Management (TQM)
	- Quick Set-up
	- Small Lot Size Production
ISO 9000/QS 9000 Compliance	- Tools & Techniques
	- Failure Mode & Effect Analysis
	- Documentation
	- Internal Audit
	- ISO 9000 Software

First-Time Supervisors	- Financial Concepts, Budgeting, Cost Control and Productivity
	- Human Relations, Conflict Management, Problem Solving
	- Technical Writing & Presentations
	- Team Building & Group Work
	- Legal Issues in Supervision
Computer Applications	- Fundamentals of Internet
	- Lotus 1-2-3
	- Windows 95
	- Microsoft Word for Windows
	- Desktop Publishing/Graphics
	- Upgrading PC Software
Basic Employability Skills	- Job-related Writing
	- Reading Technical Materials
	- Math on the Job
	- ESL for Technicians
	- Conflict Management
	- Working in Teams for Problem Solving

3. **Teacher training/retraining** will be an ongoing program of orientation to the needs of industry and participation on a space-available basis in both employee training/retraining and cluster training. Based on the successful ABEC Summer Institute, this will be a term-based seminar to demonstrate industry skill- training needs to high school and postsecondary teachers. Participating teachers will receive

information from a panel of industry trainers and employees, tour at least one major industrial site, and participate in appropriate generic courses to experience the difference of industry-driven instruction, learn industry standards and expectations, and fine-tune their own technical skills.

4. **Short-term training** in the cluster categories will be provided routinely to supplement high school and TVI instruction for students preparing to apply within the year to area employers. These courses will be offered in coordination with the Associate Degree Prep curriculum an available to ADP seniors and TVI last-term students. Industry representatives will be invited distribute applications, explain hiring procedures, and recruit these students in the CATT as they complete the CATT instruction.

In sum, the CATT program will be significantly different from regular TVI associate degree programs, which provide in-depth educational experiences. The program will also enhance TVI services and support the urban forum of the City of Albuquerque through intensified, focused linkages with business, industries, and others involved in economic development.

Section B: MANAGEMENT AND ORGANIZATION

The CATT will require the leadership of a Director, a realignment of existing professionals into a management matrix focusing on functions required by the program -- for example, rather than individual program directors (Director of Contract Training, Director of Continuing Education Studies, etc.), professional positions would combine in a team approach to address the following focus areas:

- Computer Technology & Usage
- Reskilling - Manufacturing Applications

- Professional Development
- Economic & Business Development

The team concept would coordinate across focus areas to work as liaisons with the business community in assessing their training needs and developing tailored classes, monitoring the quality of classes delivered, arranging for facilities and equipment, and negotiating contracts.

The management/professional team would share resources for such activities as:

- Marketing and Training Materials Development & Production (supplemented by periodic consultants)
- Library/Reference Materials Acquisition
- Technical Support Acquisition: Hardware, Software, Media
- Facilities Assignment/Scheduling
- Support Staff: desktop publishing, reception, general clerical; maintenance and operations; technical
- Financial Analysis (a professional-level position to monitor and track all financial transactions of the CATT)

TVI Administrative Division would provide oversight of budget and routine business. Student records would be coordinated with the Admissions Office for transferring and concurrently enrolled students. Additionally, appropriate professional staff would be represented on key TVI standing committees, e.g. Planning Committee, Management Coordinating Team, Institutional Assessment Committee.

Section C: FISCAL IMPLICATIONS

The fiscal study team reviewed the program and staffing team information and prepared a tentative budget, including revenue and expenditure projections. The report of that team follows this page.

DRAFT

1				Center for Advanced Technology and Training (CATT)													
2				Projected Revenues and Expenditures													
3				Estimates as of September 20, 1995													GOAL
4					1				2				3				4
5					Start-up												Self-sustaining
6		Grants	Fee Generated	1995-96	1995-96	Grants	Fee Generated	1996-97	1996-97	Grants	Fee Generated	1997-98	1997-98	Grants	Fee Generated	1998-99	1998-99
7			Activity	In-kind TVI	Total		Activity	In-kind TVI	Total		Activity	In-kind TVI	Total		Activity	In-kind TVI	Total
8	**Revenues(General Operating)**																
9	Albuquerque TVI Foundation																
10	XXX Corporation-- Initial Corporate subsidy	300,000				300,000				300,000							
11	YYY Corporation-- Initial Corporate subsidy	100,000				100,000				100,000							
12	Other Corporations--Initial Corporate subsidy	50,000				50,000				50,000							
13	Subtotal Foundation	450,000				450,000				450,000							
14																	
15	Grants / Contracts (Fed or Private)																
16	Small Business Develop Center	25,600				26,880				28,224				29,635			
17	State of New Mexico (anticipated)	500,000				500,000				500,000				525,000			
18	Subtotal Grants / Contracts (Fed or Private)	525,600				526,880				528,224				554,635			
19	Incubator Revenue--50,000 SFX$8		400,000				420,000				441,000				463,050		
20	Training & Project Income																
21	Seminars & Workshops--custom training		262,500				393,750				525,000				577500		
22	Training Sessions--@ATC & on-site		100,000				125,000				150,000				150000		
23	Consulting/Assessment Fees		15,000				15,750				16,538				17,364		
24	Sale of Non-Taxable Merchandise and Serv		2,500				2,625				2,756				2,894		
25	Subtotal Fee Generating Activities		780,000				957,125				1,135,294				1,210,808		
26																	
27	Operating (in-kind)																
28	AlbuquerqueT-VI			45,000				47,250				49,612				52,093	
29	Staff Tuition (credit)																
30	Staff Tuition (non-credit)																
31	Subtotal Operating Revenue																
32																	
33																	
34																	
35	Equipment Replacement Fund (restricted)																
36																	
37	**Total Revenues**	975,600	780,000	45,000	1,800,600	976,880	957,125	47,250	1,981,255	978,224	1,135,294	49,612	2,163,130	554,635	1,210,808	52,093	1,817,537
38																	
39																	
40	**Expenditures**																
41																	
42	Direct Personnel Services																
43	Faculty/Consultants/Trainers--$22/hr				35,200				48,576				61,692				65,393
44	Fringe Benefits (28%)				9,856				13,601				17,274				3,924
45	Subtotal Personnel Services				45,056				62,177				78,966				69,317
46																	
47	Direct Instructional Supplies				16,000				16,800				17,640				18,522
48																	
49	Indirect Personnel Services																
50	Director				60,000				63,000				66,150				69,458
51	Prof Develop Coordinator				45,000				47,250				49,612				52,093
52	Small Business Coordinator				20,000				21,000				22,050				23,152
53	Receptionist				14,000				14,700				15,435				16,207
54	Contract Coordinator				40,000				42,000				44,100				46,305
55	**Accounting Technician**				18,000				18,900				19,845				20,837
56	**Administrative Assistant (desktop & prod)**				23,000				24,150				25,357				26,625
57	**Secretary II**				40,000				42,000				44,100				46,305
58	**Computer Instructional Technician**				25,000				26,250				27,562				28,941
59	**Facility Maintenance and Operations**				15,000				15,750				16,538				17,364
60	**Security Staff**				13,000				13,650				14,332				15,049
61	Subtotal Personnel Services				313,000				328,650				345,083				362,337
62																	
63	Fringe Benefits (28%)				87,640				92,022				96,623				101,454
64	Total Personnel Services				400,640				420,672				441,706				463,791
65																	
66	Other Indirect Expenditures																
67	Advertising / Promotion / Printing				16,000				7,500				7,875				8,269
68	Conferences--Professional Development				7,500				7,875				8,269				8,682
69	Travel				5,000				5,250				5,513				5,788
70	Dues / Membership Fees				2,500				2,625				2,756				2,894
71																	
72	Office Supplies (includes copying & printing)				25,000				26,250				27,562				28,941
73	Postage				10,000				10,500				11,025				11,576
74	Subscriptions / Library				2,500				2,625				2,756				2,894
75	Telephone / Fax				15,000				15,750				16,538				17,364

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DRAFT

Center for Advanced Technology and Training (CATT)
Projected Revenues and Expenditures
Estimates as of September 20, 1995

3																	GOAL
4					1				2				3				4
5					Start-up												Self-sustaining
6		Grants	Fee Generated	1995-96	1995-96	Grants	Fee Generated	1996-97	1996-97	Grants	Fee Generated	1997-98	1997-98	Grants	Fee Generated	1998-99	1998-99
7			Activity	In-kind TVI	Total		Activity	In-kind TVI	Total		Activity	In-kind TVI	Total		Activity	In-kind TVI	Total
76	Utilities				273,372				273,372				273,372				267,041
77																	
78	Capital Expenditures *																
79	Software--three-year write-off				10,500				11,025				11,576				12,155
80	Capital Outlay--Computers																
81	Training--90 @ $2,500 ea				225,000												236,250
82	Office-- 10 @ 2,500 ea				25,000												26,250
83	Capital Outlay--Furniture				10,000				10,500				11,025				11,576
84	Depreciation--Funded Reserve (restricted) **																
85																	
86	Total Expenditures				1,088,068				872,921				916,578				1,211,310
87	Excess (Deficiency) of Revenues Over Expenditures				712,532				1,108,334				1,246,563				606,227
88	Beginning Balance--(Ongoing Training / Programs)				0				1,820,866				3,067,418				3,673,645
89	Ending Fund Balance--(for equipment replacement and program expansion)				712,532				1,820,866				3,067,418				3,673,645

* exclusive of building purchase and renovation which requires decision of Board

** depreciation per Internal Revenue Service methodology. (This is calculated based on building purchased or built)

REVEX830

30	Employee Tuition (non-credit)	Professional Development
31	Subtotal Operating Revenue	
33	Facilities/Capital Asset Appro	Building/Capital Asset Outlay
34	Subtotal Facilities/Cap Asset	
35	Equip Replacement Fund	Funded depreciation line 84
37	Total Revenues	
40	Expenditures	
42	Direct Personnel Services	Personnel costs that go directly into product--seminar/training
43	Faculty/Consultant/Trainer	$22/hour--current TVI cost per contact hour
44	Fringe Benefits	28%--per TVI
45	Subtotal Personnel Services	
47	Direct Instructional Supplies	16,000--Basis is Rock Valley
49	Indirect Personnel Services	Costs that are not connected with product or specific training
50	Director	1 FTE
51	Prof Develop Coordinator	1 FTE
52	Small Business Coordinator	1/2 FTE
53	Receptionist	1 FTE
54	Contract Coordinator	Estimated--1 FTE
55	Accounting Tech	Based on current salary amounts--1 FTE
56	Administrative Assistant	Based on current salary amounts --1 FTE
57	Secretary II	Based on current salary amounts--2 FTE
58	Computer Instruct Tech	Based on current salary amounts--1 FTE
59	Facility Maintenance/Oper.	Based on current salary amounts--1 FTE
60	Security Staff	Based on current salary amounts--1 FTE
61	Subtotal Personnel Serv	
63	Fringe Benefits (28%)	28%--TVI
64	Total Personnel Services	
66	Other Indirect Expenditures	Costs other than personnel that do not go directly into product

Section D: FACILITY/LOCATION OPTIONS

1. Facility Requirements

The study team reviewed projected program and staffing, and prepared a preliminary space needs analysis. In summary, the initial CATT program is anticipated to require a minimum of 46,350 sq.ft. of space for industry-specific training, 51,958 sq.ft. for generic/core classes and labs; and 18,187 sq.ft. for instructional support -- a total of 116,496 sq. ft. The detailed analysis follows this page.

TVI-CATT

Preliminary Space Needs Analysis

rev. 8/26/95

Function	Size	Number	Net SF	
Instructional Support Space				
A. Resource Room				
Technical Library	2400	1	2400	
Study Carrels	400	1	400	
Support	240	1	240	
Library Office	180	1	180	
Work Room	240	1	240	
Computer Search	240	1	240	
Front Desk	240	1	240	
Total Resource Room			**3940**	
B. Program Support				
ATTC Site Manager Office	240	1	240	
Secretary	120	1	120	
Program Director's Offices	96	4	384	
Support Space	96	6	576	
Support Personnel-Open Offices	96	12	1152	
Conference Rooms	240	2	480	
Storage	240	1	240	
Waiting Area	400	1	400	
Staff Work Area	1200	1	1200	
Staff Lounge	900	1	900	
Vending Area	240	1	240	
Cafeteria/Cold Kitchen	3600	1	3600	
Total Support Offices			**9532**	
Re-Cap Instructional Support Space				
Net Square Feet Assignable			13472	
TARE	35%		4715	mechanical, restrooms, unassignable
Total Instructional Support			**18187**	

Instructional Space

C.	**Classrooms**				
	Full Size Flex Space	2400	4	9600	
	Divisible Classrooms	1200	8	9600	
	Total Classrooms			**19200**	
D.	**Computer Laboratories**				
	CADD Lab & Computer Labs	2400	3	7200	
	Tape storage	240	1	240	
	Printer	120	3	360	
	Mentor/Training offices	96	3	288	
	Lab Office	120	1	120	
	Resource Room	120	1	120	
	Total Computer Laboratories			**8328**	
E.	**Meeting/Group Demonstration**				
	Demonstration Lab-250 Capacity	5000	1	5000	
	Small Group Meeting Room-75 each	1800	2	3600	
	Prep area	120	3	360	
	Storage	120	3	360	
	A/V Rooms	240	3	720	
	Total Meeting/Group Demonstration			**10040**	
F.	**Testing Services**				
	Mentor/Control	240	1	240	
	Testing Lab/Work Stations	48	40	1920	
	Controlled Storage	240	1	240	
	Total Testing Services			**2400**	
G.	**Distance Learning Lab**				
	Admin/Mentor/Control	240	1	240	
	Work Stations	240	6	1440	
	Controlled Storage	240	1	240	
	Tele Conf Facilities	1200	2	2400	
	Control Room	240	1	240	
	Total Testing Services			**4560**	

Re-Cap Instructional Space

Net Square Feet Assignable			39968	
TARE	30%		11990	mechanical, restrooms, unassignable
Total Instructional Space			**51958**	

Industry Program & Training Space

H.	**Eco. Development Labs**			
	Quick Response Lab	12500	1	12500
	Incubation Labs	12500	1	12500
	Industry Offices	240	2	480
	Total Industry Program			**25480**

I.	**Eco. Development/Facility Support**				
	Shipping & Receiving	2400	1	2400	
	Storage	2400	1	2400	
	Maintenance	1600	1	1600	
	Hazard Materials Storage	1200	1	1200	
	Clean Room & Lab Support	4000	1	4000	Relocated
	Total Facility Support			**11600**	

Re-Cap Industry Program & Training Space

Net Square Feet Assignable		37080	
TARE	25%	9270	mechanical, restrooms, unassignable
Total Industry Program & Training Space		**46350**	

CATT

Summary

	Gross Sq. Ft.
Instructional Support	**18187**
Instructional Space	**51958**
Industry Program & Training Space	**46350**
Total CATT	**116496**

2. Location Options

The City Economic Development Department provided the study team with information regarding three existing buildings available for purchase/lease. These locations also support the City of Albuquerque Planning Department's urban forum regarding co-location for similar uses. Each building has a minimum of the required square footage for the initially planned instructional program. All of the buildings are accessible by freeway and public transportation, and all are represented as containing the utilities to accommodate the proposed CATT instructional program.

COMPARATIVE ANALYSIS OF INDUSTRIAL BUILDINGS

	DIGITAL EQUIP. CORP. 5601 JEFFERSON NE	SIEMENS ** 501 MORRIS NE	MARTIN/MARIETTA 7500 BLUEWATER NW
PUBLIC TRANSPORTATION	YES	YES	YES
LAND AREA	46 +/- ac. 2,000,000 SF	49.22 +/- AC. 2,145,000 SF	19.9 AC. 867,000 SF
ZONING	I.P.	I.P.	I.P.
GROSS BLDG. AREA	325,000 SF	201,000 SF	180,000
OFFERING PRICE	$14,500,000	$7,800,000	$3,750,000
ESTIMATE OF VALUE-LAND	2.50/SF $5,000,000	$1.50/SF $3,200,000	$1.50/SF $1,300,000
ESTIMATE OF VALUE-IMPROVEMENTS	$9,500,000	$4,600,000	$2,450,000
IMPROVEMENTS/ S.F.	$29/SF	$23/SF	$14/SF
RATIO OF LAND TO IMPROVEMENTS	34%	41%	35%
AGE OF BUILDING	25 Years	24 Years	21 Years

** The Siemens property is under a contract of sale.

TECHNOLOGY INDUSTRIES ASSOCIATION
WORKFORCE DEVELOPMENT FOCUS GROUP
September 1, 1995 - Alb TV-I

Present:

		PHONE	FAX
Pat Foy	Intel	893-1965	893-3116
Ken Manicki	INC	843-4264	843-4255
John Lorio	INC	843-4249	843-4255
Deborah Cordier	Philips	822-7750	822-7752
Dan Gerry	Philips	822-7286	822-7752
Dr. Shin C Dass	Lasertechnics	822-1123	821-2213
Gene Bourque	Lasertechnics	822-1123	821-2213
Marshall Suarez	Motorola	828-4299	822-8812
John Jekowski	Allied Signal	844-1775	844-3604
Curt Mitchke	MIOX	343-0090	343-0093
Leland Alhorn	BDM	848-5804	848-5820
Ruth Tangman	TV-I	224-4234	224-4711
Paula Padilla	TV-I	768-6050	768-6044
Joe Rodman	TV-I	224-3711	224-3720
Phil Callow	TV-I	224-3340	224-3341
Richard Chapman	Cagle & Associates	268-8680	888-1034
Laura Ferrary	Cagle & Associates	268-8680	888-1034

MAJOR FINDINGS FROM THE TIA MEMBERS PRESENT AT THIS MEETING:

Stated their strong interest in the proposed CATT program and anticipate sustained participation.

Will be actively involved in the process as co-creators with TV-I in establishing and maintaining the CATT program, rather than serving in an advisory role.

Will support the CATT concept at the September 12th TV-I Governing Board meeting.

Will reconvene September 14th, 1:30 pm at the new Industrial Network Corporation site (NW corner of Stadium and Univ.)

Will meet at a later date regarding the two year technical career programs - to begin a high level of involvement to review and redefine course curricula.

Desire a coordinated relationship between the proposed TV-I CATT and UNM's Manufacturing Training & Technology Center.

employees who can think, solve problems, recognize quality and work well with other employees. Examples of soft skills are TQM, Team Building, conflict resolution, etc.

3. More specialized training

   Examples:

   Semiconductor manufacturing processes, use of lasers, use of specialized testing or manufacturing equipment. Sometimes this will pertain to common needs among similar employers and at other times will serve proprietary needs unique to an employer.

- **THE ROLE OF THIS FOCUS GROUP**

  The group expressed a strong desire to serve in the role of "co-creator" of the CATT programs with TV-I as opposed to acting simply in an advisory capacity. In this role, all members present agreed to meet with TV-I regularly on this program.

  Both TV-I and Association members felt the success of the program would depend on how well the program meets industry needs and the strength of joint communications between industry and TV-I.

  The TIA members suggested that they need to approach their own upper management to obtain commitments to support the CATT through both funding and participation.

- **COORDINATION/OVERLAP WITH OTHER PROGRAMS** - UNM 4 year programs and TV-I 2 year programs

  Several members (Pat Foy, Marshall Suarez, Gene Bourque, Jack Jekowski) stated their continuing long term needs for the two year programs, and the distinction between these programs and the CATT. Some members stated their satisfaction with TV-I graduates. There was agreement not to discuss the two year programs at this meeting.

  Some members expressed concerns regarding the coordination of the TV-I Center and the UNM Manufacturing, Training and Technology Center. There was a request for an official statement of the correlation between the two programs. Pat Foy reminded the group that the UNM program is at least two years away, while the CATT is more imminent. Phil Callow estimated that only 10% of the TV-I graduates would be candidates for the higher lever training to be offered by the UNM program. Another distinction cited is the focus of CATT on practical training, while UNM is going to focus on research and prototypes, and will be much smaller.

- **CURRICULUM ISSUES**

Each member of the group commented briefly on their company's training needs in relation to the CATT. Members identified three levels of training needs, all of which can be met in whole or in part by the CATT. For each of these levels, training may be customized to manufacturing, or to a particular company's needs. Training needs to be focused on specific skills needed, and be of the shortest duration necessary to achieve the objective.

Several members commented on the lack of space for training, and the potential for replacing some of the on-site training being done in-house now, that could be done in the CATT.

The focus should be on current employees - not new hires.

Gene Bourque commented that he had asked his technicians prior to the meeting about skills needed in the field that were not necessarily taught at the two year level. Their comments are also incorporated below.
CATT offerings:

1. Basic skills - Reading, writing math

   Marshall Suarez and Debra Courdier both commented on the high failure rate (over 50%) among applicants on a pre-employment academic test. Pat Foy said that 40% of the current workforce nationwide (in general, not at Intel) is illiterate.

   Members expressed a need for short term courses geared to specific industry needs such as technical writing, math related to manufacturing, quality control, etc., and reading.

   For example, Lasertechnics is now producing products based on the metric system, and technicians need proficiency in this system which they may not have applied or used except in school.

2. Fundamental skills to manufacturing

   Examples:

   Statistical Process Control, soldering, chemistry, MRP systems, MSDS, metrology, PLCs, PLSs, hardware, English vs. metric, computer use, gas handling, industry awareness, technical writing and report generation.

   Soft Skills: Several members cited the need for training beyond technical competencies. The technician that repairs a piece of equipment may also have to deal with an irate customer. Curt Mitchke cited the need for

Meeting notes:

Richard Chapman gave a brief background on the Technology Industries Association and the Association's desire to focus on workforce development as a critical issue. The purpose of this meeting today is to discuss the Center for Advanced Technology Training (CATT) currently being explored by Albuquerque TV-I.

Ruth Tangman, Associate Vice President for Instructor, gave an overview of the history of the impetus for the Center, the feasibility study that has been underway, and her goals at today's meeting:

1) Receive preliminary input from members of the Association regarding the Center - needs, specific training or classes to be considered, operational issues and concerns, etc.

2) Obtain commitment from this group to act as an on-going focus group for industry input regarding any aspect of the Center or other programs affecting Association members.

Ruth Tangman also reiterated the four purposes of the Center - see the invitation to the meeting for details. She identified the time schedule TV-I is pursuing for seeking State Legislative support - her next report is due to the TV-I Board September 7th. She spoke about the key emphasis for the CATT - fast response to industry's needs for what they need now.

Joe Rodman, Dean of Trades & Service Occupations, presented information regarding the needs, success of such programs in other communities, and why such a program is needed in Albuquerque. He believes the Center can provide a "one-stop shop" that will also serve to keep the degree program faculty current in the field.

Phil Callow, Dean of Technologies, presented information about similar programs elsewhere in the Country, classes offered, organizational structures, and commonalities among programs.

He said classes at the CATT will be a maximum of 40 hours long (as opposed to the 75 hours of classes in the 2 year program). Classes may be scheduled over several weeks, but shorter classes may be offered over a few days.

Dean Callow also talked about certification and re-certification opportunities, and said he is still looking at other programs. He emphasized the need to focus on the needs in Albuquerque, which are not necessarily the same as those in other communities.

Following the presentations from TV-I there were comments and discussion from the members present. Below is a synopsis of the comments and key issues:

Lasertechnics

Via Facsimile No: 224-4711

September 5, 1995

Ms. Ruth Tangman
Associate VP for Instruction
Albuquerque Technical Vocational-Institute
525 Buena Vista, SE
Albuquerque, NM 87106-4096

Re: Center for Advanced Technology Training (CATT)

Dear Ms. Tangman:

I am writing to express my strong support for the CATT program. I am asking that you share this letter with the TV-I Board at their September 12th meeting.

I am convinced that the CATT program will benefit companies of all sizes in our state. My management team is excited about the prospect of TV-I offering a course oriented, rapid response program that will help us quickly upgrade the average skill level of our existing employees.

CATT is the right thing for TV-I to do in today's globally based and rapidly changing manufacturing environment. Albuquerque and the state need CATT now. Thank you for the opportunity to comment on this key subject.

Yours truly,
LASERTECHNICS MARKING CORPORATION

EaBourque
E. A. Bourque
President & CEO

/jc

Gene\L.Tangman.TVI

5500 Wilshire Avenue NE, Albuquerque, NM 87113 (505) 822-1123 FAX (505) 821-2213

TOTAL P.01

MOTOROLA

September 6, 1995

TVI Governing Board
Albuquerque Technical Vocational Institute
525 Buena Vista SE
Albuquerque, New Mexico 87106

Dear TV–I Governing Board;

Motorola has been participating in the feasibility study for a Center for Advanced Technology Training (CATT). We have a strong interest in being actively involved with TV–I in Developing the CATT program. The current approach, which actively involves the business community as co–creators, a very important step to insuring CATT meets its objective of assisting current and newly hired workers get the skills to keep pace with technology. We see CATT as a very viable source for supplementing our training requirements in the future if its training program and costs are implemented as currently envisioned.

Sincerely,

MOTOROLA, INC.

Marshall Suarez

Marshall Suarez
Customer Satisfaction and Training Manager

cc: D. Bosomworth

Ceramic Products Division
4800 Alameda Blvd., N.E., Albuquerque, NM 87113
(505) 822-8801 • Fax (505) 822-8812

Sandia National Laboratories

L. Herbert Pitts
Director of Information Services

P.O. Box 5800
Albuquerque, New Mexico 87185-0622

September 6, 1995

Governor David Cargo

Chairman, T-VI Governing Board

Albuquerque, T-VI

Dear Governor Cargo:

As I explained during my time with the board last month, I strongly support the concept of a Center for Advanced Technology Training and commend the board for the analysis effort your have commissioned by Ms. Tangman. Good questions were raised by you and other board members relating to sharing facilities in this age of tight budgets, but from what I know of this project and the intent of the instruction offered at this facility, collaboration with UNM would be better coupled to other activities.

Technology training as envisioned here is of a very applied and job specific nature. Representatives of industrial organizations in Albuquerque have convinced me that a need exists for such a facility. These representatives tell me that they would gladly use such a capability to augment or even substitute for their in house training efforts. This would provide a much needed revenue stream for T-VI as well a enhancing our ability to attract new businesses to the state.

I have not spoken with the mangers in the new manufacturing sector of Sandia Labs, but I would hypothesize that we could very well use this capability as a training ground for our technicians as our staffing requirements begin to be clarified. At least we would be interested in considering people trained at this facility for employment. The local supply of people trained in manufacturing practices is small.

Thank you for the opportunity to present my support for this important initiative. And my thanks to you and the governing board for the important role you play in the life of this fine institution.

Sincerely,

PHILIPS

Philips Semiconductors

Philips Semiconductors
a North American Philips Company

3201 Pan American Freeway, NE
Albuquerque, New Mexico 87113

September 6, 1995

TVI Governing Board
TVI Community College
525 Buena Vista SE
Albuquerque NM 87106

Dear Sirs,

This letter is to confirm Philips Semiconductor's support of the TVI CATT proposal, and our commitment to actively participate in both it's design and it's ongoing operations.

Given that the CATT will provide agile, specific, customized classes tailored with and monitored by industry participants and that the center represents an active, ongoing partnership with it's user businesses, we believe that the center represents an opportunity to fill a significant gap in Albuquerque's current education programs. And that through this partnership, we can grow the rate at which we can incorporate Albuquerque residents into our manufacturing work pool by providing fast effective training on knowledge and skills matched to both the immediate and long term needs of local industry.

We are excited at the prospect to participate in bringing the center into fruition and in the many benefits we believe it has the potential to offer us.

Sincerely,

Keith Hampe
V.P. Plant Operations
Philips Semiconductors, ABQ

Intel Corporation
4100 Sara Road
Rio Rancho, NM 87124-1025

(505) 893-7000

intel.

September 8, 1995

Dr. Alex Sanchez, President
Albuquerque TVI
525 Buena Vista Drive SE
Albuquerque, NM 87106

Dear Dr. Sanchez,

Intel is certainly in support of the current study that T-VI is conducting into the feasibility of establishing an Advanced Technology Center. It is exactly this kind of cutting-edge leadership that motivates Intel to continue building on our partnership with T-VI.

T-VI has had a long and successful history of serving the needs of the workforce and industry. The Advanced Technology Center concept has been embraced by the leading technical and community colleges across the nation, so it is pleasing to see T-VI attempting to bring this concept to Albuquerque and the State of New Mexico. There is a great need for this kind of service.

Please know that I look forward to participating in the careful and strategic planning process that you have begun. Let me know how Intel New Mexico can help in that effort.

Sincerely yours,

F. Pay Foy, Ph.D.
Southwest Region Manager
Workforce Development

An Equal Opportunity Employer

Advanced Technology Center Concepts
Highlights of New Technologies and New Skills

Rosenfeld, S.A. (1995). New technologies and new skills: Two-year colleges at the vanguard of modernization. Chapel Hill, NC: Regional Technology Strategies, Inc. Supported by a grant from the Ford Foundation.

Taxonomy of Industrial Modernization Activities

Function:
Industry hub and service center

Typical Outcome Measures:
Number of participating firms, dollar value of services delivered, customer awareness, increase in demand for modernization services, level of staff experience in industry sector

Critical Success Factors:
High level of expertise in a particular industry or core (to local industry) technology; have the ability to keep pace with changes; staff have confidence of industry; have support for upgrading own skills and knowledge; not be too narrowly focused on one particular aspect of the industry; and industry leadership, with a reasonable degree of co-ownership, is critical

Examples of Best Practices:
Catawba Valley Community College, North Carolina (hosiery and furniture); Itawamba Community College, Mississippi (upholstered furniture); El Paso community College, Texas (plastics and textiles); Sinclair Community College, Ohio (auto industry and aerospace); and San Diego Community College, California (aerospace suppliers)

Function:
Technology center and teaching factory

Typical Outcome Measures:
Number of member businesses, utilization rate, level of business activity, skill levels of work force

Critical Success Factors:
Industry support and a critical mass of firms with similar needs; industry committed and included as a full partner in design and implementation; a college cannot establish such functions and then market them to industry after the fact; continual access to modern equipment and upkeep; and expertise in customized curriculum development

Examples of Best Practices:
Tulsa Junior college, Oklahoma; Hagerstown Junior College, Maryland; Southern Arkansas University Tech, Arkansas; and Rock Valley Community College, Illinois

Function:
Incubator and catalyst

Typical Outcome Measures:
Increase in demand for modernization services, new support programs and services, new business start-ups

Critical Success Factors:
Strong, articulate, committed leadership; good relations with businesses and state agencies; and a state-wide or regional mission to play a pro-active role in economic development

Examples of Best Practices:
Cuyahoga Community College, Ohio; Macomb Community College, Michigan; Gadsden State Community College, Alabama, and Haywood College, North Carolina

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Function:
Educator and gateway to work

Typical Outcome Measures:
Skills of completers, relevance of programs to local economy, enrollments, starting salaries of new entrants, increase in non-traditional applicants

Critical Success Factors:
Local industry's willingness to provide learning experiences and mentoring; good relationships with local high schools; aggressive efforts to recruit and assist underrepresented populations; and strong placement and career guidance services

Examples of Best Practices:
Oklahoma State University Technical Branch at Okmulgee, Oklahoma; Texas State Technical College, Waco, Texas; and Richmond Community College, Richmond, North Carolina

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Function:
Customized/certified trainer

Typical Outcome Measures:
Contracts with SMEs, suppliers certified, signed agreements with customers for supplier certification

Critical Success Factors:
Strong curriculum development capacity; staff certified as trainers in popular quality and supplier certification programs; and strong links to state and local economic development agencies

Examples of Best Practices:
Northern Essex Community College, Massachusetts; Pikes Peak Community College, Colorado;

Ivy Tech State College, Indiana; Augusta Technical College, Georgia; and Monroe Community College, New York

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Function:
Extension service

Typical Outcome Measures:
Number of companies assessed, changes in behavior in firms, investments in new processes

Critical Success Factors:
Close ties to other agencies, including colleges of engineering, and to economic development programs; staff with industrial experience; and a clear mission for industrial outreach

Examples of Best Practices:
The California community College system; Chippewa Valley Technical College, Wisconsin; Trident Technical College, South Carolina; Okaloosa-Walton Community College, Florida; and Oakland Community College, Michigan

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Function:
Broker and facilitator

Typical Outcome Measures:
Number of referrals to other agencies, increased demand for modern services, speed of response

Critical Success Factors:
Tight links to a wide array of information services; high visibility and credibility with industry; and staff with organizing and team-building skills

Examples of Best Practices:
Okaloosa-Walton Community College, Florida; Grand Rapids Community College, Michigan; the Oregon Advanced Technology Consortium, Oregon; Chattanooga State Technical College, Tennessee; Macomb Community College, Michigan; and Tri-County Technical College, South Carolina

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Function:
Partner and host

Typical Outcome Measures:
Number of partners co-located, number of working agreements with agencies, number of joint contracts with other agencies, number of organizations spawned

Critical Success Factors:
Experienced staff with the confidence and skills to function as coalition builders; interdependence with other agencies; clearly defined roles for each partner; administrative support; and industry need and demand

Examples of Best Practices:
El Paso Community College, Texas; Camden County Community College, New Jersey; Bevill Center, Alabama; Pellissippi State Technical College, Tennessee; and Boise State University, Idaho

Case Study Sites from the book:

Boise State Technical College, Idaho; Catawba Valley Community College, North Carolina; Oregon Advanced Technology Alliance, Oregon; Bevill Center for Advanced Manufacturing Technology, Alabama; Grand Rapids Community College, Michigan; Hagerstown Junior College, Maryland; Milwaukee Area Technical College, Wisconsin; Oklahoma State University Technical Branch, Oklahoma; Rock Valley Community College, Illinois; Springfield Community College, Massachusetts

Rosen

REGIONAL
TECHNOLOGY
& STRATEGIES, INC

New Technologies and New Skills

Two-Year Colleges at the Vanguard of Modernization

by Stuart A. Rosenfeld

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Table 1

Summary of case study sites

Site	State	Industrial Concentrations	Reasons for selection
Boise State Technical College	ID	All	Integration of two-year technology programs and services within four-year colleges.
Catawba Valley Community College	NC	Furniture, Hosiery	Special focus on industrial clusters, relationships to local industry associations.
Oregon Advanced Technology Alliance	OR	Metalworking	Alliance of multiple colleges aimed at common goals,plastics network, link to state extension program
Bevill Center for Advanced Manuf. Tech.	AL	Metalworking, Tool & die.	Success as partnership among Gadsden State Community College, U. of Alabama, and City of Gadsden, links to industry.
Grand Rapids Community College	MI	Office furniture, Auto suppliers	Ability to adapt to changing needs, success in stimulating inter-firm learning networks.
Hagerstown Junior College	MD	All	Shared flexible manufacturing facility, four-state rural service area, partnerships with related services.
Milwaukee Area Technical College	WI	Small engines, Metals	Links to state extension programs, involvement in inner city teaching factory, scale of programs.
Oklahoma State Univ. Technical Branch	OK	All	Manufacturing council, links to OK Alliance for Mfg Excellence, industry internships.
Rock Valley Community College	IL	Machine tool builders, Precision equipment	Industry and community support, leadership in local economic development.
Springfield Community College	MA	Metalworking industries	Partnership with trade association, MASS•NET alliance with other state colleges.

Table 6

Taxonomy of Industrial Modernization Activities at Two-Year Colleges and Typical Outcome Measures

Function	Typical Measures
Industry hub and service center	No. of participating firms Dollar value of services delivered Customer awareness Increase in demand for modernization services Level of staff experience in industry sector
Technology center and teaching factory	No. of member businesses Utilization rate Level of business activity Skill levels of work force
Incubator and catalyst	Increase in demand for modernization services New support programs and services New business start-ups
Educator and gateway to work	Skills of completers Relevance of programs to local economy Enrollments Starting salaries of new entrants Increase in non-traditional applicants
Customized/certified trainer	Contracts with SMEs Suppliers certified Signed agreements with customers for supplier certification
Extension service	No. of companies assessed Changes in behavior in firms Investments in new processes
Broker and facilitator	No. of referrals to other agencies Increased demand for mod. services Speed of response
Partner and host	No. of partners co-located No. of working agreements with agencies No. of joint contracts with other agencies No. of organizations spawned

Table 7

Benchmark Criteria

Direct	**Indirect**
✓ Skills levels of participants	✓ Wage rates
✓ Utilization rate of facilities	✓ New and Saved Jobs
✓ Business support	✓ Profits
✓ Cost recovery	✓ Turnover
✓ Customer satisfaction	✓ Participation of minorities and women
✓ Growth in SME demand	✓ Firm survival rate
✓ Industry experience of staff	
✓ Enrollments in technology programs	
✓ Repeat business	

The following section will analyze each of the eight functions, identifying success factors and examples of best practices.

As industry hubs and service centers

The concept of industry hubs or service centers has developed to provide a central location for SMEs to acquire specialized information and services to meet a range of needs. Such hubs are sometimes dubbed "technological observatories" because they allow SMEs to scan information about new developments in markets, techniques, and technologies. Currently such information is available to SMEs only at high costs or by relatively complicated routes through multiple agencies. Colleges that have a history of activity in customized training and a track record of working closely with businesses are prime candidates to become such hubs. In some places they develop in response to business demand. In other places, demand for training is generated by the supply of hub services, which may range from testing products and building prototypes to organizing trips and trade shows. In the best of circumstances, centers are more than central organizations that receive and respond to requests from businesses; they foster face-to-face interaction among firms, thereby accelerating learning and dealmaking.

Beginning in 1989, a major impetus for the establishment of centers was the availability of federal funds. Of the first 35 applicants to become federal manufacturing technology centers (MTC), nine were community colleges. Each of the first three winners had formal relationships with community colleges, and one was housed in a community college. In the third round of the competition (1992), the California Community College System was awarded one of two MTC grants. In 1993, the federal programs expanded in scale and scope, adding a new category called manufacturing outreach centers (MOCs) that seemed to be even more tailored to the structure of community colleges, because they required fewer matching funds and less industry concentration. But even without the carrot of federal funds, industry-specific community college centers began to take shape.

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For example, in New Hampshire, each of the technology deployment centers planned for the technical institutes is intended to have a specific industry focus. Catawba Valley Community College in North Carolina is a prime example of an existing industry hub, created to fill a void in a state where manufacturing is still dominated by apparel and textiles.

> Informally—and by default—the college operates as both an extension and technology hub for the industry-by default because there is no one else in the state with sufficient expertise and interest in the sector. Neither North Carolina State University, nor the Textile/Clothing Technology Center, nor the state Department of Commerce has paid much attention to the hosiery industry....Until the past few years, NC State's Textile Laboratory did not have any hosiery machines, and it now has only one older model. Businesses often turn to the Hosiery Technology Center (HTC) when they face common problems. For example, the HTC invited yarn suppliers to talk with knitters, dyers, and finishers about how to best deal with wax on the yarns, which is needed to avoid breakage. Thirty to forty companies got together to share information. [Case study]

Critical success factors. Centers and hubs need to include a high level of expertise in a particular industry or core (to local industry) technology and have the ability to keep pace with changes. Staff must have the confidence of industry and support for upgrading their own skills and knowledge-and not be too narrowly focused on one particular aspect of the industry. Further, industry leadership, with a reasonable degree of co-ownership, is critical.

Examples of best practices. Catawba Valley Community College, North Carolina (hosiery and furniture); Itawamba Community College, Mississippi (upholstered furniture); El Paso Community College, Texas (plastics and textiles); Sinclair Community College, Ohio (auto industry and aerospace); and San Diego Community College, California (aerospace suppliers).

As technology centers and teaching factories

The advanced technology center has become the most well-established and most often emulated model for community colleges that wish to serve and interact with SMEs. As they gain experience in what works and what does not, colleges are setting more realistic goals. The learning that has occurred over the past five years has not diminished interest in the concept, only refined the design. Under the right set of circumstances-a critical mass of firms with common technology needs, sufficient demand, and long-term support-the technology center remains a legitimate and important service.

The closely-related function of colleges as teaching factories is borrowed from two ideas: the shared manufacturing facility (promulgated by former Control Data Corporation CEO Bill Norris in the late 1980s) in which SMEs would pay for the shared use of advanced technologies at a central location, much as companies used computer service centers in the 1970s; and the simulated "factories" established by industries in Germany to train skilled employees. Teaching factories located either at community colleges or at an independent site supported by community colleges fill both niches. Vendors or businesses would presumably place advanced technologies in a teaching factory before adoption in order to train employees and work out the bugs. And expensive but only occasionally used equipment, such as coordinate measuring machines, could be shared by large numbers of small firms. This function is still in its infancy, but it has potential and application for industrial application. Milwaukee Area Technical College partners with an industry association and community development corporations to establish such a factor, called *Riverworks*, in Milwaukee's inner city. Germany's Fraunhofer Society, seeking a foothold in U.S. modernization efforts, has committed modern equipment and expertise to the site.

> [Riverworks'] plans include tapping the resources of all the local institutions-in the case of MATC, its capacity in CNC tools and CIM. MATC's John Stilp sits on the 13-member board of directors, and MATC faculty member Mike Rosen is on the staff. In some sense, the MATC involvement gives the new teaching factory an institutional legitimacy. The Teaching Factory is going to offer a continuum of services from training, to serving as a manufacturing testbed, to sharing production on state-of-the-art equipment. Giving it an international flavor, Riverworks has contracted with the Fraunhofer Gesellschaft of Germany, a highly-regarded system of applied research and technology transfer centers, to provide technical assistance. Not to be outdone, American equipment vendors including AutoDesk and Briggs & Stratton, also committed resources. [Case study]

Attempting to establish teaching factories on a larger scale, the National Center for Manufacturing Sciences has designed a national program—aimed at accelerating defense conversion—of Manufacturing Application and Education Centers (MAEC), with the expectation that community colleges will be the leading partners and MAEC host sites. Southern Arkansas University Tech, for example, would concentrate on the design and manufacture of mechanical parts, initially working with members of a network of SMEs called the Metalworking Connection, as well as firms in the Highland Industrial Park.

Critical success factors. Industry support and a critical mass of firms with similar needs appear most important. Unless industry is committed and included as a full partner in design and implementation, these efforts are likely to fail. A college cannot establish such functions and then market them to industry after the fact. Other success factors are continual access to modern equipment and upkeep and expertise in customized curriculum development.

Examples of best practices. Tulsa Junior College, Oklahoma; Hagerstown Junior College, Maryland; Southern Arkansas University Tech, Arkansas; and Rock Valley Community College, Illinois.

As incubators and catalysts

This function has two meanings. First, programs may be incubated. That is, some technology centers begin within a community college but, once operational, find that they require greater independence to be effective. If that happens, the college acts as an incubator until the program attains the maturity it need to move out. The A.L. Phillpot Center in Martinsville, Virginia, is an example. This manufacturing technology center was originally established under the auspices of Patrick Henry Community College in southern Virginia but gained its independence (under the legislation that created it) in order to give it sufficient freedom from the public schools system. It retains close ties to Patrick Henry Community College, as well as to other community colleges, but is administered independently.

Second, the college may be the catalyst whose activities results in expanded services that are needed by industry or for increased state or federal investments in modernization. Wisconsin's technical college system was the catalyst for the state's new extension service, and was instrumental in the state's successful application for a State Technology Extension Planning grant from NIST. Milwaukee Technical college faculty were the catalysts for the Riverworks Teaching Factory, and Gadsden State Community College was the catalyst for the Bevill Center, which has in turn become the catalyst for Alabama's statewide technology extension proposal.

Critical success factors. Strong, articulate, committed leadership; good relations with businesses and state agencies; and a state-wide or regional mission to play a pro-active role in economic development are all necessary for success.

Examples of best practices. Cuyahoga Community College, Ohio; Macomb Community College, Michigan; Gadsden State Community College, Alabama; and Haywood Community College, North Carolina.

As outreach offices and extension services

The heart of the nation's manufacturing modernization is the extension service. Modeled on the century-old agriculture extension service, technology extension agents are expected to become change agents and advisors for industry. Industrial extension, on a much smaller scale, has tried to emulate the agriculture extension as an engineering program, without community-based agents and the acceptance that comes from ongoing participation in local events and without the same degree of fusion of social and economic life that characterizes agricultural communities (and industrial districts in Europe). Once states realized the importance of location, local recognition, and social infrastructure, they looked to the community colleges.

A small number of community colleges have begun to operate as extension services, either through their own programs or by working hand-in-hand with university or state extension agents housed at the colleges. West Virginia, Maryland, and Kentucky, for example, have extension agents working with or at community colleges. California's MTC sends out teams of technologists "to help firms evaluate their operations and make realistic plans for a more productive future."[27] Chippewa Valley Technical College in Wisconsin is the primary extension center for its region, and Milwaukee Area Technical College is a full partner in Southeastern Wisconsin's extension program.

> MATC functions under the umbrella of the Wisconsin Center for Industrial Competitiveness (WISCIC), which was formed in 1991 as Wisconsin Center for Manufacturing Productivity's informal delivery arm....Staff of WDI who work with WISCIC are often the first point of contact for SMEs, walking them through a self-assessment before determining their interest in a full-blown assessment. A full assessment is conducted by a multi-disciplinary team from the college, universities, and state agencies, resulting in a report that summarizes a company's strengths and weaknesses and recommends improvements. [Case study]

Critical success factors. Close ties to other agencies, including colleges of engineering, and to economic development programs; staff with industrial experience; and a clear mission for industrial outreach are three main factors for success.

Examples of best practices. The California Community College system; Chippewa Valley Technical College, Wisconsin; Trident Technical College, South Carolina; Okaloosa-Walton Community College, Florida; and Oakland Community College, Michigan.

As educators and gateways to work

Despite all of the new-found interest in modernization services and customized training, the bread and butter responsibility of the college is, and always will be, education and preparation for work or further education. The best colleges offer certificate and associate degree programs in the latest manufacturing technologies; are constantly working to improve the curriculum in order to broaden the skills of future technicians; make special efforts to attract high school youth into technology programs; and place emphasis on underrepresented populations. A number of national efforts are underway to develop generic curricula for advanced manufacturing businesses. One such effort, led by former Director of the U.S. Department of Labor's SCANS report Arnold Packer, recommends a single associate degree in high-performance manufacturing, but with sector-specific specializations.[28] Oklahoma State-Tech Branch, for example, is already well on its way toward a program to produce the technicians of the future.

> While OSU/Okmulgee graduates distinguish themselves in their employment by the high quality of their applied technical skills, they are also required to demonstrate solid understanding of the theoretical foundation of these technical competencies. At the same time, all the technical programs seek to avoid becoming too narrow and too specialized. Industry wants technicians who have not only deep technical competence in their specific area, but also a broad set of skills including problem-framing and problem-solving capabilities that make them highly flexible. OSU/Okmulgee hopes to develop what President Klabenes terms a super-tech program where graduates combine strong electronics technology with mechanical, computer and manufacturing technology requirements. [Case study]

Perhaps the greatest challenge facing colleges is attracting qualified applicants for manufacturing programs, particularly minorities and women. Youth increasingly seem to prefer either white collar jobs or, if they have good math and science skills, professional occupations, leaving serious shortages of skilled technicians in many regions. Further, minorities and women, for various reasons explored in more depth in the companion report on predominantly minority institutions, are hesitant to enter two-year technical programs. In Oklahoma, the problem was addressed this way:

> Northeast Oklahoma Manufacturers Council sponsored a manufacturing academy on the OSU/Okmulgee campus in the summer of 1994. The program was structured for two full weeks, eight hours each day, and aimed at middle school students (grades 7, 8, and 9). It included tours of manufacturing facilities in the area, team-building activities and an intensive problem-based curriculum....The students were rotated through several modules of instruction, including CAD/CAM, marketing, communications, and computer integrated manufacturing. Each student went through each phase to make his or her own product. Remarkably, there were no drop-outs or even absences among these young people over the entire two week program [Case study]

Alabama's Bevill Center also makes special efforts to reach youth early:

> A final key strength of the Bevill Center is its outreach effort to local primary and secondary schools. Early on, the center's staff realized that no matter how good the center became, it would not succeed without interested local students. As board member Mary Jolley comments, "When we opened it up, we didn't have a soul come in there." To overcome this problem, the center established its SET program-"Students Experiencing Technology." Through the program, center staff would conduct tours for groups of school children, from grammar school to high school. Over 200 schools per year receive invitations; since 1987, over 136 school groups have participated in the tours with, on average, 1,250 students visiting each year. [Case study]

Critical success factors. Important elements include local industry's willingness to provide learning experiences and mentoring; good relationships with local high schools; aggressive efforts to recruit and assist underrepresented populations, and strong placement and career guidance services.

Examples of best practice. Oklahoma State University Technical Branch at Okmulgee, Oklahoma; Texas State Technical College, Waco, Texas; and Richmond Community College, Richmond, North Carolina.

As customized and certified trainers

Customized and certified training represents the initial foray of two-year colleges into economic development and, because it has helped attract industry, remains by far the most important function in the eyes of many development agencies. It was, and still is, largely designed for branch plants and unskilled or semi-skilled work, and few of these resources are available to SMEs. In the era of modernization, however, customized training is taking on new meaning. It is increasingly designed under contract to help firms of any size introduce new management or quality systems of new production processes or technologies rather than its historical purpose, which had been subsidizing training for a large, new or expanding, branch plant. Size is still a factor, and the smallest companies are still disadvantaged because unit training costs are too high to justify strict customization. But the more innovative colleges are helping companies with similar needs form training networks to reduce per-company costs. One increasingly popular mechanism is group services-organizing like firms into clusters or networks and collectively training members' employees.

In addition, colleges are placing much more emphasis on management education, both to support modernization and as a catalyst for further workforce training. At Rock Valley Community College, for example:

> [The Management Institute] markets team building, employee involvement, and other soft-skill programs both through individual consultants and/or on site classes at the firm....This unit uses instructors from the college as well as outside staff to conduct the activities—historically, about 40 percent consultants, 60 percent college staff....There is a large market in the Rockford area for the types of training offered by this unit. [Case study]

In addition, customized training is being driven by the supplier certification demands of large corporations. But still, the smaller SMEs that aspire to become suppliers receive little attention.

Trident Technical College in Charleston, South Carolina, under a grant from Sloan Foundation though RTS, developed an exemplary approach to assisting potential suppliers. The college's Productivity Center, working in partnership with the Southeastern Manufacturing Technology Center (SMTC), developed an assessment tool and related supplier certification training package for working with groups of SMEs. They validated the process by working with four SMEs. The tools have subsequently been adopted by the SMTC (including using it with hosiery firms through the Hosiery Technology Center at Catawba Valley Community College), the state of Florida, the Bevill Center in Alabama, and the Oklahoma Alliance for Manufacturing Excellence.

Some of the more secure and innovative colleges realize that SMEs need to take more responsibility for continuous training by developing their own capacity to provide training. Teaching business employees to train their own staff is a relatively new function of community colleges. For example, at Grand Rapids Community College:

> [The ATC also] works with individual companies to develop their capacities to train and educate their workforce. One client is D & M Metal Products, a metal forming job shop that expanded rapidly from 40 employees in 1992 to 63 employees in 1993....Working with staff from the ATC, the company developed a training program

> and training center for its employee, with some of the classes taught by GRCC staff and others by company employees. [Case study]

Critical success factors. Strong curriculum development capacity, staff certified as trainers in popular quality and supplier certification programs, and strong links to state and local economic development agencies are all very important.

Examples of best practices. Northern Essex Community College, Massachusetts; Pikes Peak Community College, Colorado; Ivy Tech State College, Indiana; Augusta Technical College, Georgia; and Monroe Community College, New York.

As brokers and facilitators

Small manufacturers are overwhelmed and confused by the panoply of services available to them from an array of different sources. In modernization-as in social services, training, or almost any other public service that involves multiple agencies and organizations—one-stop shopping has been proposed as a solution. Colleges cannot meet all of the needs of SMEs, but they ought to know who can. The role of broker is especially important in rural areas. The community college is an organization that SMEs find non-threatening and accessible, and therefore it is an excellent place to perform brokering functions or to locate brokers. Most of the agents of the Oklahoma Alliance for Manufacturing Excellence, for example, are housed in vo-tech centers or two-year colleges.

A smaller number of colleges are expanding the vision of brokering to include brokering not just between companies and agencies but among companies. Okaloosa-Walton Community College acts as broker for the Technology Coast Manufacturing and Engineering Network; Chattanooga State Technical College serves as broker for environmental companies; Trident Technical College in South Carolina brokers supplier training for a group of SMEs; and Macomb and Grand Rapids Community Colleges in Michigan facilitate continuous improvement user groups. In this form of brokering, the college is building a social infrastructure that supports inter-firm learning, cost-sharing, and deal-making. Ivy Technical State College in Indiana facilitates a network of ten plastics companies that meet monthly to discuss common issues. Together they have established a laboratory at the college called the Plastics Productivity Center where employees, faculty, and students collaborate on common production problems. Oklahoma State Technical Branch, under an innovation grant from the Sloan Foundation, organized the Northeastern Oklahoma Manufacturers Council (NEOMC).

> NEOMC's vision is that "Manufacturing Industries will utilize shared resources to compete at progressively higher levels of manufacturing in a global marketplace." It's mission statement is, "The Manufacturing Council will provide leadership to form partnerships to continuously improve manufacturing operations, address manufacturing issues and concerns, foster employee development, modernize technology, and support industrial education and corporate citizenship throughout Eastern Oklahoma." [Case study]

Among the most common forms of brokering is organizing firms into training classes. Tri-County Technical College in Pickens, South Carolina sponsors the Oconee Industries Partnership with eight rural metalworking firms sharing training classes. Springfield Technical Community College, working with the National Tooling & Machining Association, has become a partner in the use of networking to facilitate school-to-work transition programs.

> Several of the firms in the local chapter have formed a new corporation called MECHTECH. The new NTMA-affiliated corporation actually hires and payrolls the apprentices into an 8,000-hour program, placing them into revolving assignments with participating firms....By transferring from firm to firm every 12 to 15 weeks, the apprentices are able to develop the full range of skills that journey worker-level machinists and tool and die makers need, even though the firms themselves are small and have specialized over the past several years in certain kinds of operations....Firms participating in the program have agreed to provide training slots for the apprentices, to pay the costs outlined above, and to provide the level of supervision and mentorships associated with traditional apprenticeship programs. In an interesting twist, each firm has posted a bond which it forfeits if it hires one of the workers before the apprentice completes the full program. [Case study]

Critical success factors. The three most important components encompass tight links to a wide array of information services, high visibility and credibility with industry, and staff with organizing and team-building skills.

Examples of best practices. Okaloosa-Walton Community College, Florida; Grand Rapids Community College, Michigan; the Oregon Advanced Technology Consortium, Oregon; Chattanooga State Technical College, Tennessee; Macomb Community College, Michigan; and Tri-County Technical College, South Carolina.

As partners with and hosts for other modernizers

The way that a college interacts or fails to interact with other modernization services, other colleges, and development or research organizations is a strong indicator of its effectiveness. One prevalent theme throughout the ten exemplary sites was the tendency to build alliances and coalitions with businesses, with other modernization programs, and with economic and community development agencies. Formal partnering arrangements have become the rule, not the exception. Among the most common are small business development centers (although these often have little staff capacity to work with manufacturing), technology or economic development centers, and state technology extension programs.

Many examples of successful partnerships were discovered in our research, including the Milwaukee Area Technical College, Oklahoma State University Technical Branch at Okmulgee, the Tom Bevill Center for Advanced Manufacturing Technology, Clackamas Community College, and Hagerstown Junior College, as well as many colleges not visited—

such as the alliance of six community colleges and the New Jersey Institute of Technology which formed the Southern New Jersey CIM Center; the community college, university, and arsenal in Iowa and Illinois comprising the Manufacturing Technology Alliance; and the two two-year and five four-year colleges in the upper peninsula of Michigan allied to coordinate their programs based on individual colleges' core competencies. In Hagerstown Junior College, for example:

> Recently, one of Ernst's efforts came to fruition with the formal establishment of the QUADTEC initiative. QUADTEC (or the Quad State Technology and Manufacturing Consortium) is a partnership of the four county governments in the region, as well as the ATC, the local utility and the Letterkenny Army Depot in Franklin County, Pennsylvania. In their charter (signed in January of 1994), these partners agreed to work on fostering the global competitiveness of small and medium-sized firms in the region. [Case study]

Among the strongest and most successful partnerships are those created to apply for federal manufacturing technology centers. Each of the successful applicants based their proposals on joint efforts among community colleges, universities and, where applicable (such as in Minnesota), a nonprofit. The Southeastern Manufacturing Technology Center is a partnership with the state's technical college system and is expanding regionally principally through community colleges such as Augusta Tech in Georgia and Catawba Valley Community College and Central Piedmont Community College in North Carolina. The Mid-America MTC operates in partnership with Kansas' community colleges and, like SMTC, is expanding regionally through agreements with community colleges such as Pike's Peak Community College in Colorado. Finally, the Northeastern MTC has an agreement with the governor to offer its services through New Hampshire's system of technical colleges.

A few colleges are successfully partnering to address the special needs of the populations they serve. For example, El Paso Community College, which serves predominantly Hispanic American populations, houses:

> [A]n impressive program designed to stimulate community-based economic development and small-business enterprises in low-income communities. This outreach-oriented program was initiated under the past administration and retained by the interim president. It is funded by the Texas Department of Human Services and targets the impoverished region of the county. The objective is to link Hubs to the institutions and resources that can help them in the areas of workforce development, small business development, and social and community services.[29]

As colleges become more deeply committed to service and modernization and extend themselves farther and farther beyond the traditional boundaries of education and training, they become more interdependent with other organizations. By forming alliances and planning efforts jointly, they are better able to find their complementarities and define their responsibilities.

Critical success factors. Community colleges will be effective partners and hosts if they have experienced staff with the confidence and skills to function as coalition builders, interdependence with other agencies; clearly defined roles for each partner; administrative support, and industry need and demand.

Examples of best practices. El Paso Community College, Texas; Camden County Community College; New Jersey; Bevill Center, Alabama; Pellissippi State Technical College, Tennessee; and Boise State University, Idaho.

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE: Alabama
CENTER NAME: The Bevill Center for Advanced Manufacturing Technology

ADDRESS: P.O. Box 2488 Gadsden, Alabama 35903
(205) 547-5782 and fax (205) 5475790
Executive Director: Gregg Bennett

REGION INDUSTRIES
Industrialized--steel, tires, precision metal companies

MISSION
THE SOURCE FOR MAXIMIZING COMPETITIVENESS. Focus on regional manufacturing strengths, helps implement advanced industrial process technologies in support of Alabama companies, excellence in applied research, tech transfer, workforce training, and postsecondary education for technology students, using resources of partners, city, community college, and university, provides vision and leadership to improve industrial competitiveness and economic stability.

PROGRAM DETAIL
Industrial Problem Solving
Prototyping of new products; assessing manufacturing capabilities; designing comprehensive quality assurance and control systems; customizing and implementing comprehensive SPC systems; establishing supplier quality-certification systems; inspecting and measuring parts; implementing CAD systems for creating, storing, retrieving engineering data; preparing layouts and workflow systems for plant expansions/relocations; studying feasibility of in-plant automation; designing and installing automated process control systems; designing and implementing tool-life analysis systems; preparing shop-floor metric conversion systems; automating parts-inventory handling systems; and othesr tailored to each manufacturer's needs such as reviews, develops, and installs automated systems; prototypes new parts and processes; provides many industry services related to modern manufacturing; identify and implement cost-effective solutions, and stimulates awareness of new industrial processes, seeks long-term partnership with Alabama companies which results in their being globally competitive, problem solving research in design and analysis, inspection and metrology, inventory control and scheduling, machining and tooling, process control and system design, product development, quality and continuous improvement, and miscellaneous projects like design and implementation of a metal forming process, development of a pay for knowledge compensation system for craftsmen, and design and conduct of high-tech manufacturing jobs skills analysis

Industrial Training

Workshops, Seminars, and Vendor Demonstrations:
Basics of CAD/CAM, Choosing a CAD System, Computer-Integrated Manufacturing for Managers, Continuous Quality Improvement, Design of Experiments, Elements of Quality Control, Flexible Manufacturing Systems, Geometric Dimensioning and Tolerancing, Industrial Simulation, ISO 9000 Implementation, Manufacturing Resource Planning, Progammable Logic Controllers, Shop-Floor Data Collection, Theory of Constraints, TQM Overview, AC Drives Systems, Automated Assembly, Bar Coding Systems, CAD for Instructors, CBT-4 Coding, Carbide Tooling, Choosing a CAD System, CIM for Managers, CIM Integration, Computer-Aided Process Planning, Computers In Industry, Continuous Quality Improvement, DCA Software Usage, Design of Experiments, Design for Manufacture, Development of Tech-Prep, Flexible CIM Systems, Geometric Dimensioning & Tolerencing, IRD Vibration Analysis, ISO_9000 Awareness/Auditing, MAPICS (MRP II) Basics, Math for Machinist, MRP-CIM Architecture Interface, Networks for Small Industries, OS/2 for Managers, Plasma Cutting Methods, Process Simulation & Analysis, Programmable Logic Controllers, Progressive Die Design, Quality Control Fundamentals, Simulation of Manufacturing Systems, SmartCAM Usage, Statistical Process Control, Superabrasives (G.E.,), Total Quality Management

Manufacturing Software Packages: AutoCAD*, CADAM*, CADKEY*,Pro-Engineer*, and SmartCAM* (*registered trademark)

Advanced-Manufacturing Training: Computer-Aided Design and Drafting (CAD), Computer-Aided Manufacturing (CAM), Computer-Numerical Control Machining (CNC), Geometric Dimensioning and Tolerancing (GDT), Manufacturing Resource Planning (MRP II), Programmable Logic Controllers (PLC), Statistical Process Control (SPC), Total Plant Maintenance (TPM), Total Quality Management (TQM), Automated Production Control, Coordinate Measurement & Control, Design of Experiments, Electronics (Basic & Intermediate), Fixturing and Tooling, Geometric Dimensioning & tolerancing, Integrated Cellular Manufactruing, Inventory Control Systems, ISO 9000 Implementation, Machinist Apprenticeship Training, Manufacturing Resources Planning II, Parametric System Design a& Operation, Parametric Programming, Parts Inspection & Metrology, Production Control & Scheduling, Progammmable Logic Controller, Shop Floor Data Collection, Statistical Process Control, Tool & Die Maker Apprenticeship, Wire EDM Usage, and Wire Frames & Solids Modeling, in-plant training for new businesses, and other custom-designed programs

Degrees for Industrial Applications
Complete requirements for Associate in Applied Science Degrees for Industrial Applications: Civil engineering technology, electronic engineering technology, manufacturing engineering technology (automated, controls, computerized machining, product design, production planning/control, quality control), machine tool technology, mechanical engineering technology, internships at center or manufacturing sites (at baccalaureate level), applied research, engineering consulting, SET (students experiencing technology program and tours)

Student Projects Conducted

Design, development, creation, and/or assembly of automated inventory control system with simulation, manufacture of a mill press, integrated programmable logic control system, prototype clevis for heavy materials movement, program allowing interface of flexible CIM cell controller, implementation of computerized process planning systems, robot-controlled deburring process for metal components, large manufacturing control function database, implementation of a refractory-type insulation system, expert system program for automatic scheduling, integrated process control board system, and simulation model for manufacturing design analysis

Credit Courses

Automated Manufacturing Systems, Basics of Manufacturing, Computer Aided Design I,II, & III, Cellular Manufacturing CNC Machining I, II, & III, Computer-Assisted Parts Programming, Computer-Integrated manufacturing, Electronics (Basic & Intermediate), Engineering Graphics, Engineering Mechanics, Engineering Statics, Materials handling Systems, Metrology (Basic & Intermediate), Microprocessor Interface, Modern Industrial Controls, Parametric Design, Programmable Logic controllers, Quality Assurance & Inspection, Quality Control Systems, Robotics I & II, Shop Floor controls Integration, Simulation of Manufacturing Processes, Statistical Process Control, Strength of Material, and Total Quality Management

Faculty Requirements:

Experienced professionals, manufacturing engineers, project coordinators, training associates, training coordinators, full-time technicians, science and engineering faculty from university and community college, pool of consultants, and vendor associates

Facility Requirements:

Laboratory functions are computer-integrated and flexible, contract CAD, digitizing, inspection, limited CNC production, literature searching, problem solving, training, classrooms, industrial-sized flexible CIM laboratory, several CAD laboratories, computer laboratories, mainframe computer center, 80-seat lecture hall, C-and KU-band satellite receiving capabilities, manufacturing-based technical library for companies and students, linked with other universities and colleges through a fully equipped video teleconference center, located on a community college campus, 30,000 square foot center

Equipment Requirements: (see facility requirements)

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Joint venture--city, community college, university
Has an organizational chart: three partnerships, board of directors, executive director, industry relations manager, events coordinator, office manager, technology manager

Operational Procedures:

Staffing Arrangements:
20 staff augmented by faculty and staff of community college and university school of engineering

Relationship of Center to TVI:

FACILITIES

Space Requirements:
30,000 square foot, $6 million physical plant and $1 million operating budget

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

Alabama Power Company, Chrysler Corp, Fabricators, Electric, Tool & Die, Gametime, Goodyear Tire & Rubber, Steel, Machining, Valve, Packaging, Plasticraft, Hosiery, Stamped Products, Tyson Foods, United Applied Technology, Westinghouse

PERSONS/COMPANIES SERVED (through 5/31/95) Began August 1987

Persons participating in all programs:	35,800
Technology training:	9,405
Enrollments in credit classes:	2,363
Enrollments in customized company training:	1,515
Enrollments in workshops and seminars:	5,527
Persons in technology demos/tours:	12,879
Persons in meetings and non-tech classes:	12,784
Industrial prospect visitors:	140
Projects conducted for companies:	217
Different companies having projects:	100
Technology Demos for company/school groups:	98/177

1993
370 students in 30 credit classes
270 students in 20 customized industrial training seminars
900 participants in workshops

BUDGET

Sent for year ending 9/30/95
Does not include grant budgets
Funding start-up: Tennessee Valley Authority's budget (substantial funds through U.S. Rep Tom Bevill)
Public and private--about $2 million

Funding streams:	Spec Ed Trust Fund	350,000
	City of Gadsden	200,000
	Comm College	135,000
	University	135,000
	Other, fees for service	110,000
	In-kind salaries	250,000
	Capital expenditures	850,000
	Total	2,030,000

Two faculty "on loan" from community college
Other faculty and director are officially employees of university
Comm college full professor faculty make $58,000
Consulting fee: 37.50 per hour (1993)

COMMENTS

Identify and readily respond to technology transfer opportunities, flexibility in focus and operation, specific time frames and requirements of companies, flexible, low-cost fee schedule

Strengths: Impact on and popularity with local manufactures, the quality of the teaching, its use as a recruitment tool, and its outreach to young people, and its cohesive three-institution sponsorship, high degree of independence, three institution partnership works, center free to call on vast resources of its sponsors, independent fiscal structure lessens the damaging jealousy which can emerge between a community college nd its advanced technology arm which has budgetary and institutional separation, outstanding director

Areas for improvement: Open longer hours, especially on Saturdays, their workers leave before the benefits of training pay off, training and consulting prices were too high, center should address the lack of basic math and science skills in potential students, poor choice in its wire EDM machine, class size smaller for credit students, excessive faculty workload, investment in "bells and whistles' high tech equipment (insatiable capital needs), poor outreach beyond the immediate area, lack of a program to bring in more female, minority and disadvantaged students (under-represented populations), and a lack of success to date with manufacturing networks

MODEL

Stand alone building; 30,000 square feet; $6 million physical plant; $1 million operating budget; shared faculty on-loan from community college or university; $37.50 consulting fee (1993); city, community college, and university partnership; manufacturing industry; rather rural area; established due to shrinking industries in 1980s.

bevill

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	California
CENTER NAME	Advanced Technology Center
ADDRESS	De Anza College 21250 Stevens Creek Boulevard Cupertino, CA 95014 (408) 864-8672 or fax (4080 864-5454 Terri O'Connor, Director Marketing and Communications

REGION INDUSTRIES
Silicon Valley high-technology firms

PROGRAM DETAIL
Courses:
Accounting, computers (Computer Applications and Office Systems, Computer Information Systems), computer writing, engineering, English as a second language, film/television, foreign languages, general business, graphic design, manufacturing and design, (with options in machining and manufacturing, system technician, and drafting/design, and mathematics

Credit courses, Associate in Arts, Associate in Science, Certificate of Proficiency, Certificate of Completion, Achievement, and Proficiency, transfer opportunities for students seeking a bachelor degree

Faculty Requirements:
De Anza Community College Faculty

Facility Requirements:
Fiber-optic network backbone in the building
Twisted pair wiring to each workstation
Wheelchair-accessible elevator
Exterior wheelchair ramps surrounding the building
Wide doors to accommodate sheelchair entry
Lever-type door handles for ease of manipulation
Braille directional signs

Equipment Requirements:
600 workstations most with Internet capabilities (eventually 1,200 workstations)
Novell and Silicon graphics file servers
Large, high-resolution monitors
Adjustable workstations to accommodate wheelchairs, mouthsticks, and trackball usage
Speech synthesizer

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Community College

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:
66,000 square feet, three-story structure

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

Building cost: $14.5 million
Equipment cost: $5 million
Funded: Proposition 78 (November 1988) Part of $600 million in general obligation bonds to fund construction and equipment for California's four-year and two-year public colleges
State: $3 million for equipment

Seeking local support to adquire funds for acquisition and maintenance of computers and peripherals.
Established a Capital Campaign for the Advanced Technology Center to generate $1 million in capital and equipment donations

COMMENTS

MODEL

Open fall 1994
Stand alone, 66,000 square foot, three story structure
Incubator for new models for teaching and learning with technology, cooperatove-partnerships with businee and industry, and innovative new instructional delivery systens which address student needs for the 21st century.

deanza

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	California
CENTER NAME	The Training Source
ADDRESS	Mt. San Antonio College 1100 North Grand Avenue Walnut, CA 91789 (909) 468-3933 Karen S. Meyers

REGION INDUSTRIES

PROGRAM DETAIL

Courses:

Small Business Development Center (counseling, marketing, financial skills, management, start or expand your business, domestic or international), wellness services (health and fitness assessments, nutrition and weight control, personalized programs, stress management, injury prevention), total quality management (teamwork, communications, statistical process control-SPC, problem solving process), technical skills (CADD/CAM, CIM, healthcare occupations, computer applications), management and leadership (basic supervision, time management, problem solving, marketing), the basics (English as a second language, math business writing, computer literacy, oral presentations), assessments (skills assessment, job analysis, task analysis, alternatives, training needs assessment), job placement (computerized job matching, interview assistance, no cost assistance for employer), safety programs, training programs, business assistance, workshops, seminars

Credit and non-credit courses

Faculty Requirements:

Faculty at Mt. San Antonio college

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Technically skilled trainers

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL

SBDC: Funded by Chancellor's Office of Community Colleges, California Trade and Commerce Agency, U.S. Small Business Administration, and local private and public funds

The Training Source connected with Mt San Antonio College, Walnut California

Mtsanant

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE California
CENTER NAME Center for Applied Competitive Technologies

ADDRESS
San Diego Technology Incubator
San Diego City College
1313 Twelfth Ave
San Diego, CA 92101
(619) 230-2081 or fax (619) 230-2162
Joan A. Stepsis, Ph.D., Dean/Director
Tyler Orion, MBA, Special Projects Manager/Incubator Manager

REGION INDUSTRIES

MISSION
Assist area manufacturers through education, training, and technology transfer services to modernize their production capabilities in order to remain competitive in today's changing economic environment and defense conversion assistance.

PROGRAM DETAIL
California Manufacturing Technology Center (CMTC): new technology-based manufacturing techniques, resolution of specific manufacturing problems, defense conversion opportunities, product quality, advanced material technology, reducing cycle times, implementation of just-in-time product delivery systems, reduced design-to-market time, flexible manufacturing, environmentally sound manufacturing, workforce assessment and training to implement new technologies, TQM, continuous process improvement, on-site, state of manufacturing assessments for individual businesses, flexible plans tailored to specific manufacturing problems, seminars and workshops on manufacturing technology, research to provide information about specific business problems, customized training programs, and grants support charged services offering exceptional value to clients

Center for Applied Competitive Technologies (CACT): Affiliate of CMTC under NIST, technology transfer services; customized consulting, installation of process improvement programs, not-for-credit programs at worksite or at CACT facilities

TQM Readiness:	VESL, Shop Math, Basic Measurement
Advanced Quality Practices:	Concurrent Engineering, Design for Manufacturability, Design of Experiments, Advanced SPC, ISO 9000
Customized Technical Training:	Advanced Machining CNC (CATIA, CADKEY, MasterCam, AutoCad, SmartCam, Vericut, Blueprint Reading, Metrology

MRP: Manufacturing Resource Planning
Leadership, Presentation Skills, Meeting Management, and Strategic Planning

Geometrical Dimensioning and Tolerancing
Preventative Maintenance
Robotics/Flexible Manufacturing Systems
Basic Electronics
Introduction to Computer Numeric Control (CNC)
Hydraulics/Pneumatics
Programmable Logic Controllers (PLCs)
Technical Math, Basic Shop Math, SPC Readiness Math
Advanced Statistical Process Control (SPC)
Basic Measurement Instrumentation
Computer Integrated Manufacturing (CIM)
  Concurrent Engineering, Design of Experiments
Customized Chemistry
Design for Manufacturability
Geometrical Dimensioning and Tolerancing (ANSI 14.5Y)
Just-in-Time
Lot Traveler Systems
Object-Oriented and Ada Programming Languages
Preventative Maintenance
Robotics/Flexible Manufacturing Systems
Set-up Time Reduction
SPCL Short Run
Vocational English-as-a Second-Language (VESL)
Entrepreneurship: Operations, Marketing, Finance, Technology

California Supplier Improvement Program (CalSIP): Total Quality Management (TQM), statistical process control (SPC), cycle time reduction and just-in-time (JIT), teamwork, leadership and communication (TLC)

San Diego Technology Incubator (scheduled to open July 1995)
Business Idea, Entrepreneurship Training, Business Plan, Business Development Assistance, Financing, Incubation (Step Plan)
Incubation:

Facilities:	Private Suites and Manufacturing Facilities, Conference and Training Rooms, Resource Information Center
Business Development Training:	Operations, Marketing, Finance, Technology
Support Services:	Accounting Services, Mentor Programs (legal, marketing, accounting), Copy, Fax, Scan, Laser, Color Print, Postage and Shipping
Technology Labs:	CIM/CIE, CAD/CAM, CNC, Automation

Faculty Requirements:
Managed by a multidisciplinary team of experts with a broad range of industry experience, technology transfer teams, college faculty, independent contractor/consultants

Facility Requirements:
One of eight regional advanced technology centers designated by State of California

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Administered by San Diego Community College District and housed at San Diego City College
Director, Business and Operations Manager, Industrial Consultant, Advanced Production Technologies/CIM Coordinator, technology transfer teams

Operational Procedures:
Serves region's manufacturers involved in manufacture/fabrication of metal parts, industrial machinery, telecommunications equipment and systems, electronic components and instruments, chemical and allied products (biotech, pharmaceuticals) plastics and composites, and food products

Center provides demonstrations, workshops, seminars, vendor presentations, teleconferences, education and training activities, on and off-site, and has conducted over 40 worksite technology transfer programs at manufacturing firms

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:
Administrative offices, conference and seminar rooms, and an industrial automation lab

Equipment Requirements:
Industrial automation lab, machine technology lab (CAD/CAM/CNC facility)and plans to create MRP/CIM lab
Received $1.5 million grant by the U.S. Department of Education to design, develop, test, and disseminate a national training model for the machine tool industry

Infrastructure Requirements:
Can meet many of the process improvement and manufacturing technology needs of local industry

COMPANIES SERVED

Over 3,500 manufacturers in San Diego and Imperial Counties in Southern California
Client base of over 200 companies

PERSONS/COMPANIES SERVED

BUDGET

Grants from National Institute of Standards and Technology (NIST) and State of California
Incubator: Grant award from U.S. Department of Commerce, Economic Development Agency
Major contributions from contractors for California Supplier Improvement Program (CalSIP)

COMMENTS

MODEL

Managed by Center for Applied Competitive Technologies (CACT), the San Diego Technology Incubator will be housed in an existing downtown facility run by City College (old automotive department which will undergo a $1 million renovation to house 10 research and 20 manufacturing areas from machining work to prototyping, tenants out on their own in 18 to 24 months, concentrate on high technology and conversion to commercial or other governmental markets, incubator must have roots in defense industry, have a business plan and have potential for creating jobs, pay rent on sliding scale, supplemental courses covering subjects like insurance, strategic planning, and accounting, by time they get into incubator they should be functioning as a company, "If there was already a model that was absolutely successful for a high-tech incubator, the government wouldn't need to pay us to do this experiment," Stepsis said (Douglass, E. (March 8, 1994). Economic laboratory. San Diego Union-Tribune, p. C1-2. "We just have to play with some models and see what works."
San Diego Technology Incubator: 19,000 square feet, 20 resident start-up manufacturing and related high tech companies, on-line resources and advisory structures.

National Institute of Standards and Technology (NIST) and State of California
support
California Manufacturing Technology Center (CMTC)
directs efforts of field engineers at
Center for Applied Competitive Technologies (CACT)
is an affiliate of CMTC and houses
San Diego Technology Incubator

Sandiego

ADVANCED TECHNOLOGY CENTER CONCEPT

Key Characteristics of Advanced Technology Center Models

July 1995

STATE Colorado

CENTER NAME Pikes Peak Community College
Corporate, Workforce, and Economic Development--a division of PPCC

ADDRESS Colorado Springs, CO

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Skills training (BEST), manufacturing training, basic electronics, motor control, welding, PCC control, computer skills, HVAC, hydraulic and pneumatic machining fundamentals, graphics, C, C++, Excel, WordPerfect, Unix, human development skills, CAD/CAM

Faculty Requirements:
70 plus part-time

Facility Requirements:

Equipment Requirements:
None

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Dean, Assistant Directors (2), Project Leader

Operational Procedures:

Staffing Arrangements:
21 people
70 + trainers

Relationship of Center to TVI:

FACILITIES

Space Requirements:
None

Equipment Requirements:
None

Infrastructure Requirements:
Part of community college (PPCC)

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL

Part of community college

ppcc

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE Florida
CENTER NAME Florida Resource Center

ADDRESS
Florida Resource Center
Daytona Beach Community College
1200 International Speedway Boulevard
PO Box 2811
Daytona Beach, FL 32114
(904) 947-3106 or (904) 254-4492
Jerry W. Lancio, Director

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
DACUM: Developing A Curriculum
Business & Professional Institute
Construction Technology
Hospitality Management
Photographic Technology
Interpreter for the Deaf
Dental Assisting

Faculty Requirements:

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Director

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:
Connected with Daytona Beach Community College

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL

Connected with Daytona Beach Community College

daytona

ADVANCED TECHNOLOGY CENTER CONCEPT

Key Characteristics of Advanced Technology Center Models

July 1995

STATE Illinois

CENTER NAME Rock Valley College Technology Center

ADDRESS
3301 North Mulford Road
Rockford, Il 61114-5699
(815) 654-4250 or fax (815) 654-4459
Rolland O. Westra, Director

REGION INDUSTRIES

MISSION

To help manufacturers compete in a world economy by providing education, training and related services.

PROGRAM DETAIL

Courses:
Manufacturing, Workforce Training, Business, Vocational Training

Computer Integrated Manufacturing (CIM): Engineering, Manufacturing Planning, Shop Floor Stereolithography--translates computer instructions into laser movements that beam into liquid polymer. The liquid becomes a solid shape specified by the computer design.

Credit courses include: Fundamentals of Numerical Control, Computer Numerical Control Programming, Numerical Control Programming on Microcomputers, Automated Work Cell Integration, Advanced AutoCAD, Introduction to CV Personal Designer CAD System, Control Systems and actuators, Introduction to Robotics and Automatic Controls, Digital Controllers, Electro-Mechanical Devices, Principles of Material Management, Material Requirements Planning, Production Activity Control and Just In Time, Metrology

Workshops include: CNC Setup and Operation, CNC Programming, Integration of CAD/CAM/MRPII, Quick Changeover - Tooling and Fixturing, CMM Programming and Operation, Job Estimating and Customer Quotations, Design of Machining Cells, Shop Floor Simulation SPC for Managers, Rapid Prototyping, Metrology

Individual Training Assistance Program (ITAP)

Industrial Training Program Grant from Illinois Department of Commerce and Community Affairs

Faculty Requirements:

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Director of Technology Center and Director of Computer Science
Two engineers who work with local companies to assess their levels of manufacturing modernization.

Operational Procedures:

Staffing Arrangements:
Support staff

Relationship of Center to TVI:

FACILITIES

Space Requirements:
Training rooms, conference center, conference room, classrooms, faculty work room, offices, computer room

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

Manufacturing based district of 290,000

BUDGET

Local funding approved by the College District citizens in a 1985 referendum, $8.7 million
Taxpayers, Community/Industrial Leaders, Advisory committees, Rock Valley College Foundation

COMMENTS

MODEL

Stand alone technology center, classes began in January 1988, Rock Valley college offers two-year associate degrees, has approximately 13,000 students

rock

GRAPHIC ARTS TECHNOLOGY CENTER of IOWA

A Foundation for the Future

1951 Manufacturing Drive
Clinton, Iowa 52732
(319)242-0802
FAX(319)242-0812
1-800-967-8324

July 11, 1995

Lois Carlson, Assistant to the Dean
Business Occupations Department
Albuquerque Technical-Vocational Institute
525 Buena Vista SE
Albuquerque, NM 87106

Dear Lois:

I received your request for information today regarding development and implementation of an advanced technology center. The information enclosed relates to most of the items you have listed. I would also be very interested in reviewing the final results of the project.

The following is information on the Graphic Arts Technology Center of Iowa:

1. Program Description

The Graphic Arts Technology Center of Iowa (GATCI) is a hybrid facility combining education, training, technology and economic development and making it available to Iowa and the Midwest region. The facility is dedicated to providing opportunities that allow the graphic arts industry to remain productive and competitive.

The mission of the Graphic Arts Technology Center of Iowa is to provide a comprehensive training and resource facility that will enable the region to continually stay competitive in the graphic arts industry. Through a broad range of applied training and research, technical assistance, and educational programs, the Center enhances economic development and competitiveness throughout the region.

The goals of GATCI are:

- to provide on-site assistance in evaluating and implementing new technology
- to provide quality, state-of-the-art technical training to business and industry
- to act as a regional clearinghouse for graphic arts related information
- to provide a model for the safe and appropriate use and disposal of hazardous materials
- to assist industry in utilizing Total Quality Management (TQM), Statistical Process Controls (SPC), and other quality approach methods
- to provide avenues for training technical personnel in supervision and management techniques

- to act as a neutral source by providing a testing site for technology under actual floor operations
- to expand the industry workforce through diploma and associate degree programs
- to act as a life-long learning source

2. Technology Link With:

Secondary Schools -- To date, not much other than discussions on some articulation and joint apprenticeship programs. In Iowa, we also have the Iowa Communications Network (ICN), a fiber link across the state. The Center is working to get on-line this fall to help us hook up with other educational institutions as well as industry. The Internet will also be playing a major role in our activities this fall in hooking up with other institutions and industry.

Student Transition -- Clinton Community College has a two-year Associate of Applied Science printing program and a two-year Association of Applied Science drafting program housed at the Center. These students are recruited and placed through the college. The GATCI staff concentrate solely on retooling individuals from companies involved in printing and visual communication. We provide customized training, some non-credit programming, information dissemination and access to technology via manufacturer consignments.

Curriculum Reform -- The Center staff participate on a number of advisory boards for printing programs across the state. We also are active on industry association educational boards.

Curriculum Articulation -- Clinton Community College has a number of articulation agreements. These are all handled through the academic affairs department at Clinton Community College.

Teacher Training -- To date, we have not done any teacher training. The Center is one and one-half years old and has not had time to concentrate on any activities other than its mission.

3. Organizational Structure

This particular center is somewhat different in that we are associated with a community college district where the director of the center answers to the president of one of the campuses. Funding, on the other hand, comes from the state, and our service area is Iowa and the surrounding midwest region of Nebraska, South Dakota, Minnesota, Wisconsin, Illinois and Missouri. It is accurate to say that the college district hosts us, and we work for all of the community colleges in Iowa. I would be happy to discuss this relationship in more detail if you would like.

4. Community/Business/Other Survey

In 1991 a needs assessment survey of the printing industry was done of approximately 800 firms in Iowa and western Illinois. The survey identified the need for a facility and function such as the GATCI. A follow-up survey on technical needs was done in 1994 addressing technology and training. Copies of both surveys are enclosed. We also survey target markets in order to bring in consigned equipment from manufacturers.

5. Other

-- Target an industry for your ATC. This gives you a lot of buy-in from your major client -- that industry. Serve more than just your district. It takes a lot of dollars, people and time to do this, so the bigger the service area the more the buy in. Have as much of this lined up as you possibly can. It will help you finalize the project.

-- When designing the facility, if that is a route you take, involve industry! Establish an advisory board composed of primarily industry members but including some educational members and support such as banks and developers. They will provide the initial leadership and guidance and help give the center a business perspective. Get more than one opinion, and, most importantly, involve your in-house people. For example, include faculty if they teach in an area that will be in the new facility or have facilities people plan custodial, maintenance and budget concerns for a new facility. Hire a director as soon into the planning process as possible.

-- Let the ATC function as a business. Do not put the facility in a role as a high tech academic institution.

I hope this information is helpful. If you should have additional questions or need more explanation, please call.

Sincerely,

John C. Ward
Director

JCW:pkp

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE Maryland
CENTER NAME Hagerstown Advanced Technology Center

ADDRESS Hagerstown, MD

REGION INDUSTRIES

PROGRAM DETAIL
Courses:
CAD/CAM, CAM, SFCIM, Computer R-----, Industrial Controls, Photonics, Application Computer Science, Automated Manufacturing, Quality Assurance, Robotics

Faculty Requirements:
Computer Science, Automated Manufacturing, Microprocessor Applications, Electronics, Materials Science, CAD/CAM, Computer Repair, Photonics, Production Control, robotics

Facility Requirements:
Shared manufacturing center

Equipment Requirements:
New companies for start up and expansion of old

ORGANIZATIONAL/MANAGEMENT PLAN
Administrative Structure:

Operational Procedures:
Contract training, loan space, incubator, classes

Staffing Arrangements:
8 full-time staff

Relationship of Center to TVI:

FACILITIES

Space Requirements:
63,000 square feet
ATC and Technical Innovation Center

Equipment Requirements:

Shared flexible computer, integrated manurfacturing, CADKEY, PLCs, GD&T, SPC, Microcad, major equipment, SmartCAM, Novell, Oracle
Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

$5 million budget
$4 million equipment

COMMENTS

A lot of donated equipment

MODEL

Stand alone

hager

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Massachusetts
CENTER NAME	Western Massachusetts Center for Business and Technology Development
ADDRESS	Springfield Technical Community College One Armory Square Springfield, MA 01105 (413) 781-1314 or fax (413) 739-5066 Thomas Holland, Vice President

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Electronics, laser, electro optics, business enterprise, training, consulting, Novell Institute, AutoCAD, computer consulting, LAN, computer installation, technical assistance, executive consulting service

Faculty Requirements:
Center for Business and Technology (CBT)--no faculty and does not maintain its own courses, a virtual training organization

Facility Requirements:
No building--all over college, occupies Armory,

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Operational Procedures:

Staffing Arrangement:
6 full-time staff, part-time, adjunct, contractors, consultants, faculty attached to STCC, operates as a broker between firms in the region and the academic departments of the college

Relationship of Center to TVI

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

Private, not supported by state, community college has 4,000 day students, 3,000 evening students, and 5,000 advanced technology clients, "operates in center of a very crowded education market" (Rosenfeld, 1995, p. 139) (Rosenfeld, S. A. (1995). New technologies and new skills. Chapel Hill, NC: Regional Technology Strategies, Inc.). STCC responds as needs presented, closely linked and working with industry, 15 community colleges joined MASS*NET to pool resources, proactive, relationship with local chapter of National Tooling and Machining Association (NTMA), challenges are to improve quality of technical offerings and integrating technical skill development with business management training.

MODEL

Community college housed in Armory, small staff, respond to needs of clients with consultants, contractors, and faculty

STCC

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE Minnestoa
CENTER NAME Fox Valley Technical College

ADDRESS 1825 North Bluemound Drive
PO Box 2277
Appleton, WI 54913-2277

REGION INDUSTRIES

PROGRAM DETAIL
Courses:
Business and Industrial Testing, Contracted Services, Customized Microcomputer Training, General Studies Opportunities, Wisconsin Centers for Industrial Competitiveness (WisCIC), AutoCAD, Desktop Publishing, Personal and Professional Development, Total Quality Management,. wood Technics

Faculty Requirements:
Technical College

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN
Administrative Structure:

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL

Fox Valley Technical College

foxvally

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Minnesota
CENTER NAME	Minnesota Center for Academic Technology and Technology Learning Center
ADDRESS	Inver Hills Community College 8445 College Trail Inver Grove Heights, MN 55076

REGION INDUSTRIES

PROGRAM DETAIL

Courses:

Multimedia Design: Designing Presentations with compel, New Features of ToolBook 3.0, Introduction to ToolBook 3.0, Multimedia Features of ToolBook 3.0

Word processing, spreadsheets, databases, desktop publishing presentation, multimedia

Faculty Requirements:

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES
Space Requirements:

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL
Connected to Inver Hills Community College

inver

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE Missouri
CENTER NAME Center for Business, Industry, and Labor

ADDRESS St. Louis, MO

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Training, Quality consulting, work design, productivity train-the-trainer (leadership, TQM, technical and performance technology), work assessment, ISO 9000, assessment math

Faculty Requirements:
180 full-time and part-time

Facility Requirements:
None now

Equipment Requirements:
None

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Director
6-8 Managers

Operational Procedures:
Customized training and analysis, instructional design, employee assessment

Staffing Arrangements:
180 full-time and part-time

Relationship of Center to TVI:

FACILITIES

Space Requirements:
None

Equipment Requirements:
Computers, networks

Infrastructure Requirements:
130,000 students
Service area is 718 square miles

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

Funding:	State/Company Foundations	(59%)
	Economic Development	(27%)
	Direct Company Pay	(14%)

MODEL

No space requirements per Phil. Is it connected with some organization?

Stlouis

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	North Carolina
CENTER NAME	Advanced Technology Center Central Piedmont Community College
ADDRESS	P.O. Box 35009 Charlotte, NC 28235 (704) 342-6786 or fax (704) 342-6276 George Timblin (704) 342-6557

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Credit courses, invite industry, go on-site to industry, continuing education
Electronic manufacturing: electric engineering, electric engineering technology, computer science, machine technology

Faculty Requirements:
Connected with community college

Facility Requirements:
Separate building

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Connected with community college

Operational Procedures:

Staffing Arrangement:
Each lab has a support person

Relationship of Center to TVI

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

MODEL

Connected with community college, electronics manufacturing industry area

piedmont

ADVANCED TECHNOLOGY CENTER CONCEPT

Key Characteristics of Advanced Technology Center Models

July 1995

STATE	Ohio
CENTER NAME	Advanced Integrated Manufacturing Center
ADDRESS	Sinclair Community College Dayton, OH

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Degree programs, Just-in-Time, CNC, Basic____, manager and manufacturing processes, computer, reverse engineering, operator training

Faculty Requirements:
Two full-time program managers
One technician

Facility Requirements:
Yes, Model Factory-Machining

Equipment Requirements:
Computers, manufacturing equipment, machining center, Swiss lathe, 4-5 Axis, CNC, CNCIDOD_____, horizontal machining center

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Operational Procedures:
More off-site training, do projects on hardware to test hardware, help companies with work

Staffing Arrangements:
4/5 full-time

Relationship of Center to TVI:
Great--four- and two-year school partnerships

FACILITIES

Space Requirements:
40,000
Seven classrooms, two computer labs, machine labs, multiple buildings

Equipment Requirements:
Machining, plastic injection

Infrastructure Requirements:
Joint venture with center, University of Dayton and Sinclair Community College

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

Subsidized by Sinclair Community College and University of Dayton, operator certificate, consignment of machines

MODEL

Multiple buildings, partnership with Sinclair Community College and University of Dayton

SCCOhio

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Oregon
CENTER NAME	Advanced Technology Center
ADDRESS	Wilsonville, OR

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Precision Sheet Metal, Prototypes, Master CAM. CADKEY, AutoCAD, Precision Nuts/Screws, Small Production, Scopes, Optics, focus is small to medium size companies, Power Co___, Plastics, Semiconductor

Faculty Requirements:
Mostly part-time

Facility Requirements:
Demonstration space, wood products lab, production space

Equipment Requirements:
None--do not own equipment, use equipment from firms training for

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Incorporated 501(c)(3) corporation
Board of Community College members (13) each with one vote
Director at Center

Operational Procedures:
Reactive--mostly
Becoming more proactive, seeking work, load people to industry to problem solve

Staffing Arrangements:

Relationship of Center to TVI:
Friend

FACILITIES

Space Requirements:
Computer labs, large equipment labs, classes, IBM simulation cell

Equipment Requirements:
None--do not own hardware, except computers
No cast-off equipment

Infrastructure Requirements:
Seminars, workshops, classes--equipment specific

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

Funding from State (40%), Community College (30%), Contracts (30%)
Some distance education

MODEL

Stand alone

Oregon

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE Tennessee
CENTER NAME Oak Ridge Centers for Manufacturing Technology

ADDRESS
PO Box 2009
Oak Ridge, TN 37831-8091
(615) 574-3452 or fax (615) 574-2000
Joey Lloyd, Training Manager

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Skills Campus: Craft Skills Training, Distance Learning, Train the Trainers, School-to-Work, Manufacturing Skills: Industrial Maintenance, Machining, Machine Tool Maintenance

Industrial Maintenance: Piping Fit-Up and Template Layout, Sketching, Metal Layout and Fabrication, Electrical Blueprint Reading, Personal Computer Maintenance and Troubleshooting, Advanced Personal Computer Maintenance-Data Recovery and File Management

Machining: Operation of Computer Numerical Control (CNC) Machinery, Introduction to 5-Axis Operations, Fundamentals of Programming for CNC Mills, Basic Electric-Discharge Machine (EDM) Wire Feed Operations, Cutting Tool Feed Rates and Speeds, Tool and Cutter Grinding, Understanding shop Drawings for Metal Fabricators, Shop Inspection Techniques

Machine Tool Maintenance: Basic Theory and Operation of the Autocollimator, Machine Tool Alignment and Instrumentation, Geometric Alignment and Repair, Scraping Operations I, Numerical and Computer Numerical Control (CNC) Maintenance

Courses Taught by Pellissippi State Technical Community College: Mechanical Blueprint Reading for Machinists, Industrial Mathematics for Machinists, Mathematic Review for Electricians, Technical Problem Solving

Manufacturing Technology Deployment, Manufacturing Technology Demonstration, Manufacturing Technology Development, Energy and Environmentally Conscious Manufacturing, Manufacturing Quality and Process Assurance, Industry-Specific Technology

Faculty Requirements:

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Proposal, Standard User Agreement, full cost recovery basis

Operational Procedures:

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

DOE, funds available through DOE Small Business Initiative, for small business-approved users 50 percent of hourly rate is subsidized by DOE

COMMENTS

MODEL
Stand alone, Skills Campus is building educational partnerships with community colleges and universities, funded by DOE, January 1994, training to 1,700 workers, proposal, then Standard User Agreement allowing private sector companies and educational institutions easy access to the unique facilities and expertise

oakridge

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Texas
CENTER NAME	Bill J. Priest Institute for Economic Development
ADDRESS	Dallas, TX

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Business and Industry, Small Business, International Business, Government Contracts, Non-credit, Transfer of Technology, Business and Professional Institute, Spanish Electives, Business Incubation

Faculty Requirements:
At least BS or MS

Facility Requirements:
Not a campus, classrooms, conference rooms (100 limit), cafeteria

Equipment Requirements:
Print shop--part of campus
None

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Provost
2 Vice Presidents (Business, Instruction)
Directors

Operational Procedures:
Proactive--Business and Professional Institute, Contract
Reactive--SBDC
Partner--Chamber of Commerce, Groups, Office

Staffing Arrangements:

Relationship of Center to TVI:

FACILITIES

Space Requirements:
150,000
Large classrooms--12 to 100

Equipment Requirements:
Computer labs, automotive bay and equipment, typewriters, ten-key machines, alternative fuels

Infrastructure Requirements:
Division of DCCC--Dallas _____ Community College

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

Subsidized
Tax, Grants, Community College

MODEL

Part of community college

Dallas

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Texas
CENTER NAME	Advanced Technology Center
ADDRESS	El Paso Community College El Paso, TX

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Plastice, machining, computers
560 hours

Faculty Requirements:
23 FTE
Seven full-time faculty support staff
20 part-time (35 hours-6 hours)

Facility Requirements:
55K, small

Equipment Requirements:
Plastics, Machine tools, lathes, 10,000 square feet (CMM, stereolithography, rapid prototype)

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Director, Coordinator, Industrial Liaison, Vocational Guidance Counselor

Operational Procedures:
Proactive and Reactive

Staffing Arrangements:
See above

Relationship of Center to TVI:
Do have cross over with UTEP

FACILITIES
Space Requirements:

Equipment Requirements:
Center owns (see above)

Infrastructure Requirements:
Cooperative activities with university, collaboration
COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS
Outside 10-20%
Inside 80%
All non-credit
EPCC, state reimbursement, customize training

MODEL
Stand alone center

elpaso

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Texas
CENTER NAME	Texas Engineering Extension Service (TEEX)
ADDRESS	Texas A&M University System College Station, TX 77843-8000 (409) 845-7225 or fax (409) 862-2888 Dr. G. Kemble Bennett, Director

REGION INDUSTRIES

PROGRAM DETAIL

Courses:
Administration, Construction Equipment and Public Works, Electric Power Training and Safety, Electronics, Engineering, Fire Protection, Law Enforcement and Security, Management, Occupational and Environmental Safety Small Business, Telecommunications, Transportation, Water and Wastewater, Maritime Training and Safety

Faculty Requirements:
430 instructors and support personnel
Instructors hold academic credentials, have real-world experience, and on-the-job training in the technical subject matter they teach

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:
Director, Member of University of Texas A&M System

Operational Procedures:

Staffing Arrangement:
430 instructors and support staff

Relationship of Center to TVI

FACILITIES

Space Requirements:
TEEX is headquartered in College Station, TX
Occupies more than 300,000 square feet of office, classroom and laboratory space
New regional training center in Houston--60,000 square-feet
Four regional training centers in Texas

Equipment Requirements:
State of the art training aids valued at $75 million

Infrastructure Requirements:

COMPANIES SERVED

PERSONS/COMPANIES SERVED

Conducts more than 5,870 classes annually
Trains more than 120,000 workers each year
Provides more than 80,000 hours of technical assistance annually
Works with 3,628 companies
Assists 1,392 municipalities and state agencies
Employs 430 full-time staff members
Operates through 13 training divisions
Offers courses in every region of the state through its four regional training centers
More than 110,000 use TEEX services annually

BUDGET

In excess of $40 million

COMMENTS

TEEX played a lead role in helping the Texas Department of Commerce secure $20.9 million to create the Texas Manufacturing Assistance Center network under the federal Manufacturing Extension Program, available for the 20,000 small manufacturers in Texas to compete more effectively in the global marketplace, OSHA Training Institute Southwest Education Center in Arlington, international recycling, training, and technology center in Dallas,

MODEL

New regional center in Houston, four regional centers, extension centers, part of Texas A&M, funding from federal Manufacturing Extension Program, Texas A&M is a land grant school

teex

ADVANCED TECHNOLOGY CENTER CONCEPT
Key Characteristics of Advanced Technology Center Models
July 1995

STATE	Wisconsin
CENTER NAME	Wisconsin Centers for Industrial Competitiveness (WisCIC)
ADDRESS	Northwest Wisconsin Manufacturing Outreach Center (NW MOC - a NIST-affiliated center) (715) 232-2397 Larry Schneider, Coordinator

MISSION

To improve quality and productivity

REGION INDUSTRIES

PROGRAM DETAIL

Courses:

Integrated Technical Assistance Projects, Referral projects, focused technical assistance projects: management, manufacturing technology, teams, people development, quality systems, finance, information systems, design and research and development

Faculty Requirements:

Facility Requirements:

Equipment Requirements:

ORGANIZATIONAL/MANAGEMENT PLAN

Administrative Structure:

Members are drawn from Wisconsin's Technical Colleges, University of Wisconsin Engineering Schools and UW-Extension, private four-year colleges and universities, and the Wisconsin Department of Development

Operational Procedures:

Staffing Arrangement:

Coordinator

Relationship of Center to TVI

FACILITIES

Space Requirements:

Equipment Requirements:

Infrastructure Requirements

COMPANIES SERVED

PERSONS/COMPANIES SERVED

BUDGET

COMMENTS

WisCIC can help you develop a vision and mission for your firm, computer-driven interview to establish a firms profile, generates recommendations, process of vision, assessment, planning and facilitation, focuses on initial attention on management development and planning

MODEL

Four regional WisCIC centers, part of NIST (same as San Diego CACT)

TABLE 3

SELECTED NEW MEXICO OCCUPATIONS TYPICALLY REQUIRING POSTSECONDARY EDUCATION

Occupation	1988-2000 Numeric Increase
General Managers & Executives	3,930
Truck Drivers, Heavy & Light	3,690
Engineers -- all types	3,050
Registered Nurses	2,840
Electrical & Electronic Technicians	2,300
Cooks, Restaurants & Institutions	2,290
Food Service & Lodging Managers	1,830
Secondary School Teachers	1,670
Electrical & Electronic Engineers	1,520
Elementary School Teachers	1,200
Licensed Practical Nurses	1,160
Accountants & Auditors	1,060
Lawyers	1,060
Systems Analysts	920
Technical Managers (engineering., math & science)	950
Computer Programmers	850
Sales Representatives (excluding. scientific. & retail)	790
Financial Managers	780
Auto Mechanics	750
Therapists -- all types	670
Education Administrators	660
Marketing, Advertising & Public Relations Managers	650
Electricians	650

NEW MEXICO
JOBS FOR GRADUATES
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